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GP Publications, Inc.

# **CD-ROM** *Today*™

**The Magazine of Personal Multimedia**

**39 SOFTWARE  
REVIEWS!**

- Applications
- Education
- Entertainment
- Reference

**Using MIDI and Multimedia:  
How to Get Started**

**Year of the Dinosaur:  
Mesozoic Monsters on CD-ROM**

**Multimedia  
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**A Guided Tour**

**Desktop Speaker Systems:  
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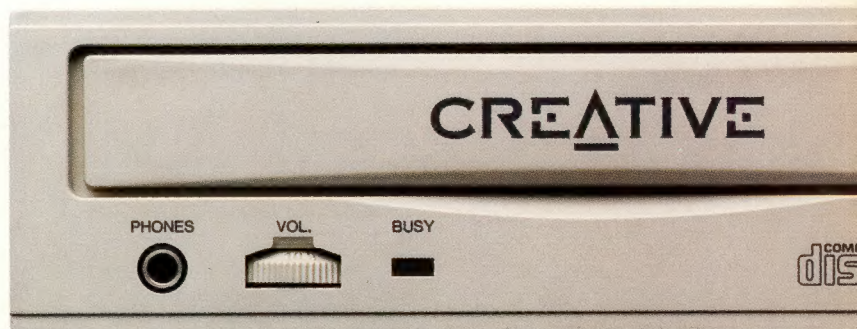
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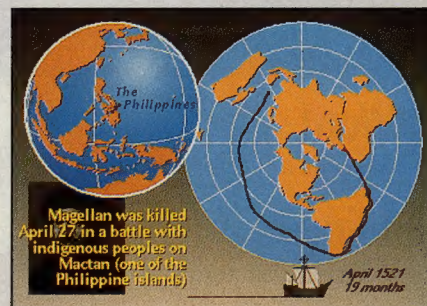
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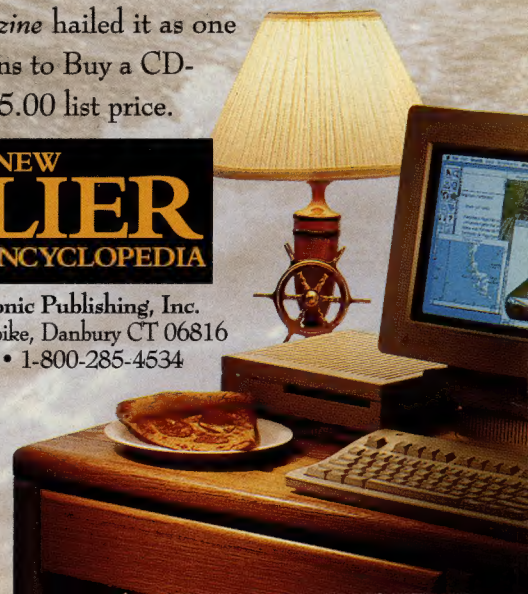


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# CD-ROM Today

The Magazine of Personal Multimedia

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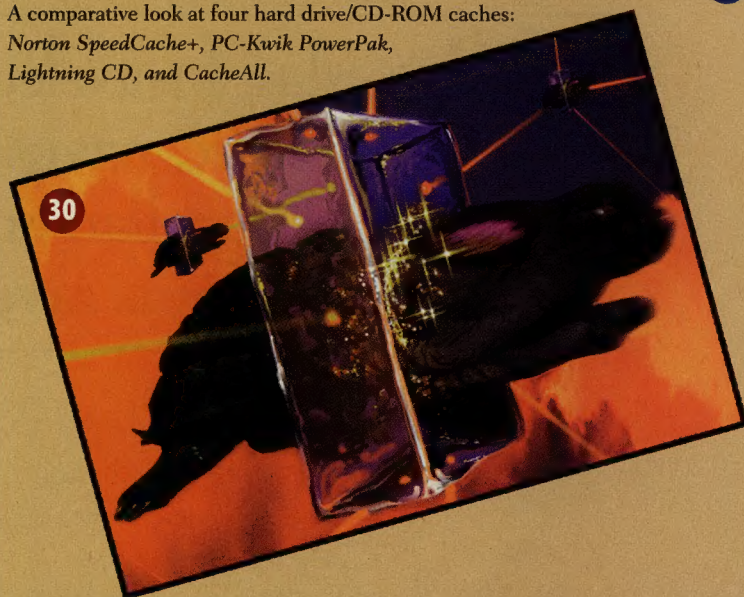
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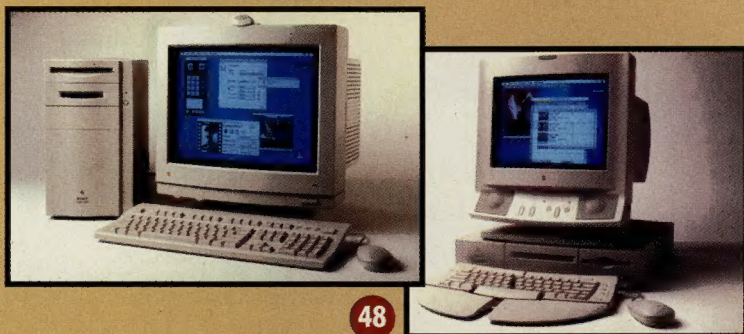
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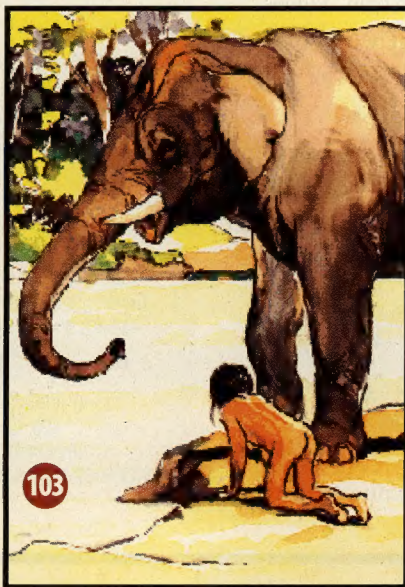
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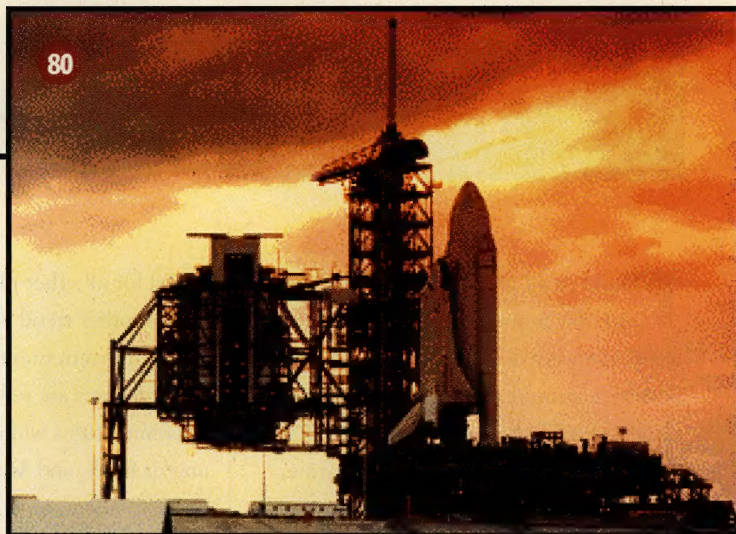
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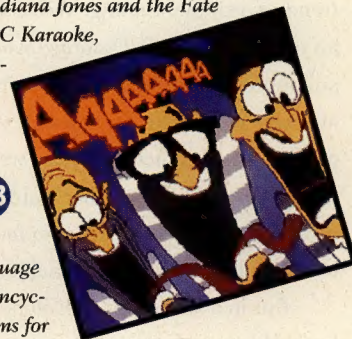
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*Jane's Electronic Library, 1992-1993: Volumes 1 and 2, Total Baseball: 1993 Edition, How Computers Work, The Software Toolworks Presents...Space Shuttle, Global Explorer, Seven Days in August, Time Almanac 1993, Adventures, Small Blue Planet, CNN Newsroom: Global View, Americans in Space*

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# FIRST

# WORD

# CD-ROM Today

The Magazine of Personal Multimedia

FALL 1993

**T**hanks to all of you who wrote to let us know how you liked our premiere issue. We were delighted by all of the positive comments, and we want to continue to hear from you. Your feedback is a key ingredient in shaping this magazine, and it helps us achieve our goal: to deliver the kind of information you want and need. We've responded to some of your questions in our Q & A section (SoundingBoard). There were so many interesting letters, we could have expanded this department to three or four pages. We'll increase the size of SoundingBoard next issue. So keep writing — we read every letter.

The CD-ROM/multimedia market is growing quickly. And even though it has begun to blossom in only the past ten or so months, we've already observed some trends worth mentioning. We've noticed an *increased use of CD storage space*. More and more CD-based titles are using the available megabytes for content, video, graphics, and audio. Last year, we saw a number of CD-ROMs that would have fit nicely on two floppies. One, in fact, used *two* megabytes. Hardly justifiable.

But in a short time, developers have learned how to better implement and integrate multimedia components; and they're now using an increasingly sophisticated collection of tools for development and authoring. The result is not only greater use of each multimedia component, but also better use.

We're also seeing the *positive effects of competition*. As more CD-ROM drives and multimedia upgrade kits are sold, more titles are developed. And as one CD-ROM program sets a new standard for quality in its category, the stakes are

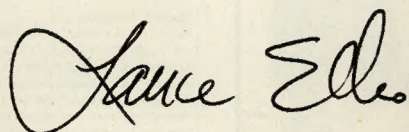
raised for all other players.

Another trend is *more cross-platform titles*. In recent months, a growing number of companies are telling us that their upcoming titles will run under Windows and/or DOS, and Mac. And why not? Once the content is in place, it's often an easy port — a no-brainer in some cases — to move it to the PC or Mac. It's a win-win situation, not only for software marketing and sales departments, but also for consumers. (And as long as one disc services all formats, retailers are happy, too.) In many of the PC/Mac titles we've seen, there's little if any difference between the versions.

Finally, we're seeing a significant *influx of new CD-ROM publishers*. Every week, we get a letter, press release, or phone call from a new player in the market. This proliferation serves the market and the consumer well. The greater the diversity, the greater the possibilities.

All of these changes are signs of a healthy, growing market. And it's not just the software arena that's maturing — the evolution in hardware technology is also driving the growth in the CD-ROM/multimedia market. Be sure to read "Video-View" and "Multimedia: The Salvation of Apple?" elsewhere in this issue for some recent hardware-related news.

Until next time, enjoy this issue. And remember to drop us a line — we'd like to hear from you.



Lance Elko  
Editorial Director

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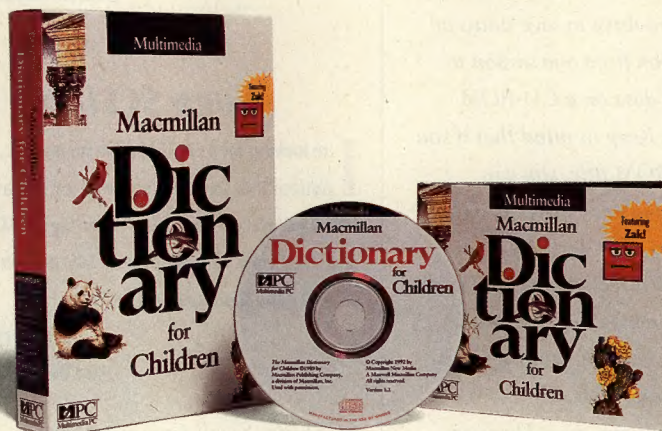
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*New Media*

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Zak!**



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# SOUNDING BOARD

## CD-ROMs, Hard Drives, and Check Outs

**I**n your last issue, you explained that hard drives have faster data-transfer rates than CD-ROM drives. Is it beneficial for the two devices to work with one another? Is this how "save your progress" CD-ROM games work?

Also, how soon will we see CD-ROMs available for checkout at public libraries?

Thomas R. Gambucci  
Madison, Wisconsin

CD-ROM software developers often maximize a program's performance by setting up a directory on your hard drive. As a result, start-up is faster, and frequently accessed files don't have to be constantly reread from the slow CD-ROM drive.

If nothing else, a CD-ROM program will need your hard drive to save status or progress information from one session to another, since the data on a CD-ROM can't be modified. Keep in mind that if you quit using a CD-ROM title, you can usually reclaim some hard-drive space by erasing its directory. This is easier if you create a CD-ROM directory and install all new titles as subdirectories (for example, C:/CDROM/FILENAME). You can always re-install the program later.

As to your final question: There are relatively few libraries currently involved in CD-ROM lending programs, but more are coming on-line everyday. Compton's NewMedia announced a Lending Library Program this summer in which bundles of CD-ROMs — children's storybooks, general reference, music, travel, business, and Compton's own Interactive Encyclopedia — are available at special prices to libraries. Compton's program includes 40

titles, including many from their affiliate labels. All of the CD-ROMs are stamped "For Lending Only" since software rental is still illegal without approval from the software publisher.

## A Thistle By Any Other Name...

**C**ongratulations on your first issue. One glaring error did spoil my enjoyment briefly. The first sentence in the review of *Victor Vector and Yondo: The Vampire's Coffin* will make English majors smile and Scots reach for their dirks. Shakespeare wrote a lot, but he never wrote about the best-laid plans of mice and men. That was Robbie Burns, as a good library-on-disc might have shown.

Robert R. Bearisto  
Hudson, Massachusetts

## Even SCSI-er

**I**'m looking for a CD-ROM drive for my Mac, and I've noticed that some drives are advertised as having SCSI-2 interfaces. What's the advantage of SCSI-2, and will it work with the built-in SCSI port on my IIsi or will I need some special adapter?

Jerry Walters  
Paso Robles, California

SCSI (the Small Computer System Interface) has become very popular for attaching all sorts of peripherals to computers, but it's been plagued by compatibility problems. SCSI-2 is a refined, slightly extended, and much more specific version of the standard. If and when SCSI-2 becomes universally supported, it will be much easier to connect any two (or three or four) SCSI devices and be sure that they'll work well together.

In the meantime, though, it's just one more variant of SCSI. If a SCSI-2 CD-ROM drive is being sold as a Macintosh peripheral, chances are quite good it will work with your IIsi as is. But you should make sure that the package includes driver software, and it's always wise to look for a dealer who will let you return the drive just in case you run into problems.

## Reader Assistance, Please

**I**'m looking for a CD-ROM collection of music lyrics from Broadway shows and popular artists over the years (General MIDI files would be great if included). Can you tell me if anything like this exists or may be coming?

Neal Mazer  
Albuquerque, New Mexico

**D**o you know of any labels designed to go on the edge of CD-ROM caddies? I have yet to find a label that I feel safe in using.

Anne Pound  
Dyersburg, Tennessee

OK, readers — can you help? We're stumped, so we'll turn this one over to you. Write to us, c/o SoundingBoard. We'll check it out and let Neal, Anne, and everyone else know next issue.

## INTERACT!

Have a question? Comment? Write to:

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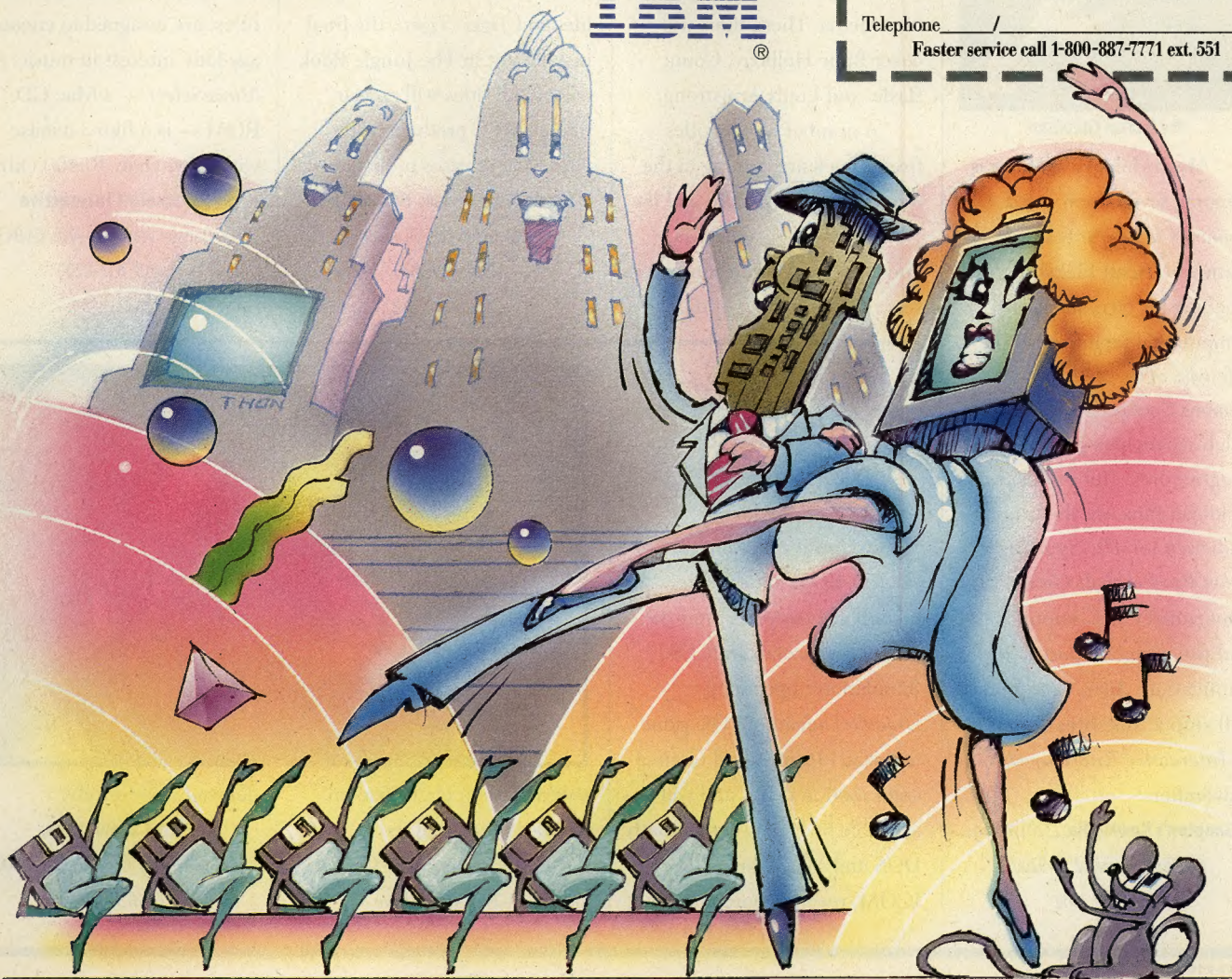
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# NEWS LINE

## Compton's Purchased by Tribune

Compton's NewMedia has been purchased by The Tribune Company, a media conglomerate best known for publishing *The Chicago Tribune*. The seller, Encyclopedia Britannica, will receive approximately \$57 million in cash.



*The Human Calculator*

Meanwhile, Compton's is shipping several new titles. *The Human Calculator* features math whiz Scott Flansburg teaching his own quick-computation techniques. *The Lifestyles of the Rich and Famous Cookbook* assembles celebrity recipes gathered by program host Robin Leach. Gridiron fans are the target audience for *The Sporting News Pro Football Guide*, a joint project of Compton's and the popular sports publication. Also, Compton's will ship a Macintosh version of *Interactive Encyclopedia* in November.

**Compton's NewMedia**, 2320 Camino  
Vida Roble, Carlsbad, CA 92009  
(619) 929-2500

## Ebook Engaged

Ebook is in the process of developing a number of titles to be published by other companies. Time Warner Interactive will publish music-oriented CD-ROMs about jazz greats Duke Ellington and Dave Brubeck, as well as the Sixties rock scene that grew out of the Bay area. All three of these titles should be in stores before Christmas.

Other ventures include the development of three more jazz CD-ROMs for Compton's NewMedia. These titles will cover Billie Holliday, Count Basie, and Louis Armstrong.

A number of new titles from Ebook are coming in the months ahead. *Aladdin and the Wonderful Lamp* adds 3-D animation and a new musical score to its retelling of the

classic tale.

*Bach* extends Ebook's Multimedia Music Book series, and features coverage of the composer's life and work, as well as some of his most beloved music. *Vivaldi's Four Seasons* showcases Vivaldi's masterpiece and studies it through biographical and liner notes.

Ebook's lineup is rounded out by *Trouble in Mind*, an interactive novel based on the journeys of a man assessing his life, and *Tiger! Tiger!*, the final installment in The Jungle Book trilogy. All titles will appear first as MPC products with later Mac releases probable.

**Ebook**, 32970 Alvarado-Niles Rd., Suite  
704, Union City, CA 94587  
(510) 429-1331

## Paramount Enters CD-ROM Market

Entertainment giant Paramount announced the formation of a new CD-ROM software company last May. Paramount Interactive is now shipping four titles, each with a \$59.95 SRP. *Busytown* is based on Richard Scarry's popular children's books. It's available for both DOS and Mac. *Lenny's MusicToons* and *Rock Rap 'N Roll*, both MPC titles, are designed to encourage kids' interest in music. And *MovieSelect* — a Mac CD-ROM — is a film database with more than 40,000 entries.

**Paramount Interactive**,  
700 Hansen Way, Palo Alto, CA 94304  
(415) 812-8200

## ICOM To Unleash Dracula By Halloween

The Count's first interactive CD-ROM appearance takes place ten years after the original story ends in ICOM Simulations' upcoming *Dracula Unleashed*. The game features 136 scenes of original color motion video, and will be available by Halloween on both DOS and Mac formats. ICOM, recently purchased by



entertainment giant Viacom, has also noted that its previously announced *Global Golf* CD-ROM will be

delayed indefinitely.

**ICOM Simulations**,  
648 S. Wheeling Rd., Wheeling, IL 60090  
(708) 520-4440



INTERACTIVE HORROR MOVIE

# HERE NO ONE RESTS IN PEACE.

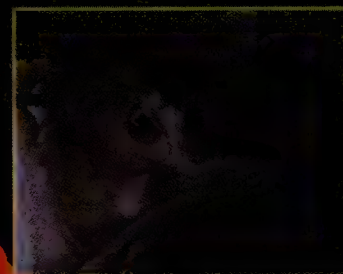
Dracula is back, driven by revenge and a hunger for human blood. Follow a trail of vampire brides, corpses, and wolf tracks through the streets of London. You direct the drama, suspense, and passion as you are drawn into a world of evil where every decision and action you make is inextricably tied to the fates of those you love.

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# Dracula

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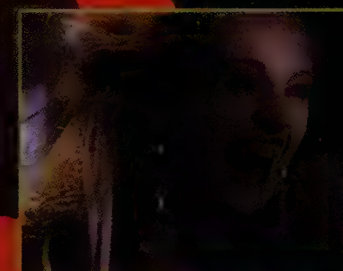
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**SHAREWARE****Call Toll Free 800/245-6717****Sony: Bullish About CD-ROM**

Sony has recently established one partnership, one distribution agreement, and made one acquisition. Sony and ESPN will produce a series of PC-based CD-ROM games that

incorporate ESPN announcers, sets, and footage. ESPN *Baseball Tonight* and ESPN *Sunday Night NFL* should be released in December, with additional titles coming in '94.

Sony has also added 13 new titles to its affiliated label program by inking a distribution agreement with U.K.-based Media Design Interactive. This is Sony's second

European association, after acquiring Psygnosis, the English publisher of *Lemmings*, among other titles. Psygnosis will continue to publish under its own name, but will also develop software for Sony Imagesoft, Sony's video-game division.

**Sony Electronic Publishing**, 9 W. 57th St., New York, NY 10019 (212) 418-9439

**New Titles from Software Toolworks**

Expect a tidal wave of CD-ROM titles this

world (for DOS, MPC, Mac, and 3DO); *The Software Toolworks Presents...Capitol*

available, and a 3DO version is due out in December.

In November, Toolworks is planning to release *Star Wars Chess*, an MPC CD-ROM chess game based on the Chessmaster 3000 engine, and populated with characters from the Star Wars trilogy. Another MPC chess title due out in November is *The Chessmaster 4000 Turbo*, which includes advice and commentary from chess champ Anatoly Karpov.

**Star Wars Chess**

fall and winter from The Software Toolworks. Currently shipping are *The Software Toolworks Presents...Oceans Below*, a first-person exploration of SCUBA diving, featuring various locations from around the

Hill, an interactive tour of the capitol, with emphasis on day-to-day congressional activities (for DOS, MPC, and Mac); and *The Software Toolworks 20th Century Video Almanac*, a five-disc set led by *The Best of Our Century* and followed by four *Our Century in Depth* titles (Sports, Science & Technology, Arts & Entertainment, and War, Politics & Disasters). The DOS version of the *20th Century* set is

3DO versions of *Space Shuttle* and *The San Diego Zoo Presents...The Animals!* are also slated for November release.

*Megarace*, a fully rendered 3-D race game set in the future will ship in a DOS CD-ROM version in November, and in 3DO and Sega CD formats by Christmas.

**The Software Toolworks**,  
60 Leveroni Ct., Novato, CA 94949  
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Product Information Number 157

### Sanctuary Woods Announces Heavy Product Lineup

Sanctuary Woods is getting aggressive about the CD-ROM market. The British Columbia publisher opened a U.S. office in the San Francisco Bay area this summer, and announced a heavy CD-ROM product release schedule.

During the first half of 1994, Sanctuary Woods will release *Once Upon A Forest* (based on the environmentally correct film released this summer) on MPC, Mac, and 3DO formats. Also in development are four sequels to last year's *Victor Vector & Yondo: The Vampire's Coffin*.

The futuristic boy-scientist-and-his-dog team will return on Mac and MPC in *The Last Dinosaur Egg*, *Hypnotic Harp*, *Cyberplasm Formula*, and *Teleforce Ray*. 3DO versions are slated for '94 release. Details are still sketchy about the other I-Venture (SW's new adventure line) product *Hawaii High*, although we do know that the company hopes to introduce the series late this year, with a second adventure coming in '94.

Also coming are *It's A Dog's Life* (for MPC and 3DO formats), an interactive

children's story from actress/producer Shelley Duvall, and *The Selfish Giant* (MPC and Mac), an adaptation of the Oscar Wilde children's story.

Sanctuary Woods also acquired Toronto-based educational CD-ROM developer Mind F/X this summer to help expand the company's new I-Learn line. Three language educational titles are due before year's end. Sanctuary Woods' titles are distributed by Electronic Arts.

**Sanctuary Woods**, 1875 S. Grant St., Suite 260, San Mateo, CA 94402  
(415) 578-6340

### Four from CMC

Four new CD-ROM titles from Creative Multimedia Corporation have just been released. These include *Dinosaur Safari*; *Parenting: Prenatal to Preschool*; *The Chaos Continuum*, a futuristic strategy thriller; and *The Magic Death*, which follows the award-winning debut *Who Killed Sam Rupert?* in CMC's Virtual Murder series. All four titles are expected to be released in both Windows and Mac formats.

**CMC**,

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## Notes of Interest

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is offering a  
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tuition to the  
winner of the  
"Monarch Notes

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contest asks  
students to  
answer five  
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(answers to  
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Bureau's

*Monarch Notes*  
on CD-ROM).  
Contest deadline  
is October 30,  
1993. For more  
information,  
send a SASE to  
"Monarch Notes  
Finals!" P.O. Box  
14, FDR Station,  
New York, NY  
10022.

• In other  
contest news,  
The Voyager  
Company is  
sponsoring a  
writing contest  
entitled "New

Visions, New Voices," which  
will showcase creative uses of  
the personal computer. Entries  
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exploration and military this  
upheaval. Also included in the  
latest edition are 15 multimedia  
Knowledge Explorer essays.  
*Grolier Electronic Publishing,*  
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*CT 06816 (203) 797-3500*

• Aztech Labs' new *Sound*

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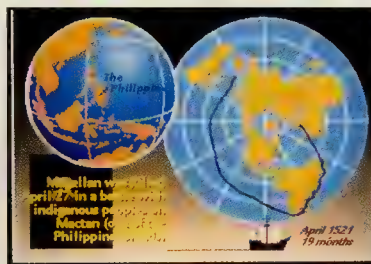
*High-tech home shopping? Cameron's Fine Art Poster Catalog on CD-ROM (\$49) leads you through nearly 600 works of art, from the old masters through contemporary pieces — and lets you order prints of the featured works. Although there are pleasant classical and jazz music bits accompanying this Windows-based presentation, we wish viewers had more control of the slideshow. Nonetheless, it's an interesting idea, and an enjoyable tour — especially if you're in the market for some fine-art prints.*

*Cameron Enterprises, 1425 Market Blvd., Suite 1320-G0, Roswell, GA 30076  
(800) 765-1-ART*

For more info, write to "New  
Visions, New Voices," The  
Voyager Company, 578  
Broadway, Suite 460, New  
York, NY 10027.

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to update its *Multimedia*  
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• Although there are dozens  
of photo collections on CD-  
ROM, we haven't seen many  
designed for Kodak's Photo  
CD format. *Corel's Profes-*  
*sional Photo CD-ROMs* is a 30-  
disc collection, covering a  
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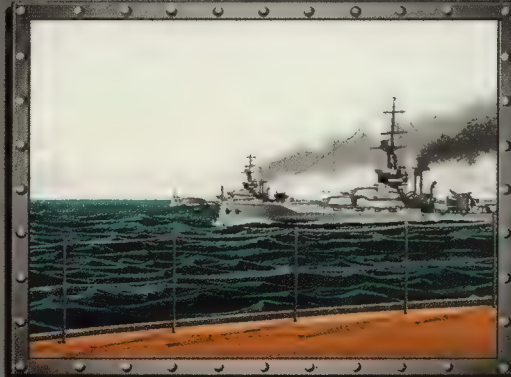
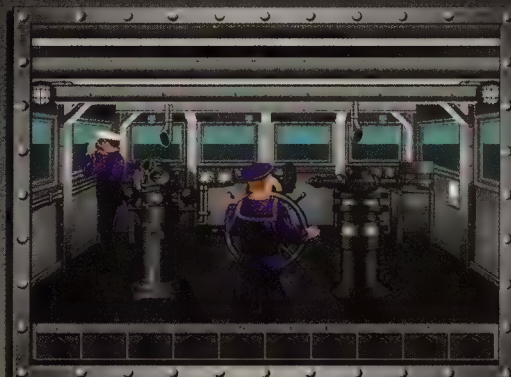
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• **Genoa Systems'** new AudioGraphix multimedia card functions as a 24-bit graphics accelerator and an audio enhancer. The sound component is equipped for 16-bit recording and playback, and includes an 11-voice FM MIDI synthesizer. AudioGraphix retails for \$299 and includes bundled software. *Genoa Systems, 75 East Trimble Rd., San Jose, CA 95131 (408) 432-9090*

• **MPI Multimedia** has teamed up with The WPA Film Library to produce two collections of QuickTime movies. *Cars! Cars! Cars!* and *The Archives of History* each have more than 250 clips. *Cars!* contains footage of James Bond's Aston Martin and Ford's notorious Edsel, while *Archives* covers the 20th century — from the Model T to Desert Storm, with clips of Hitler, Jackie Robinson, and Twiggy. Owners of these CD-ROMs can incorporate the clips into their own presentation authoring. *Cars!* and *Archives* are now available for the Macintosh, with MPC



**The Great Kat, coming to CD-ROM**

versions in the works. *MPI Multimedia, 5525 West 159th St., Oak Forest, IL 60452*

(708) 535-1540

• For something fast and loud, **Road Racer Records** is unleashing ... er...presenting The Great Kat (nee Katherine Thomas, former Julliard violinist turned heavy-metal guitarist). The Kat's latest CD, *Beethoven On Speed*, mixes speed metal renditions of classical favorites with the manic feline's own in-your-face compositions. She calls

this new musical hybrid "Digital Hyperspeed," and the CD-ROM version of her album, due in October,

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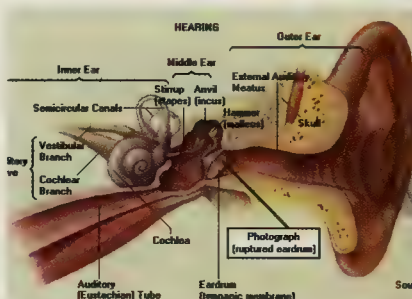
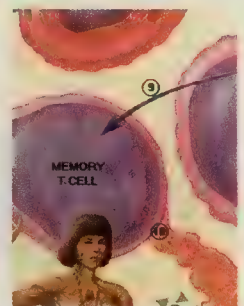
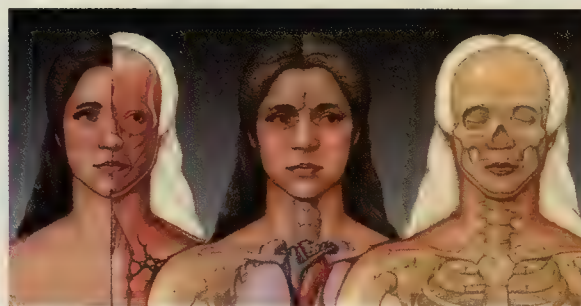
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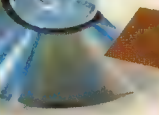
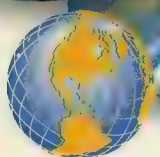
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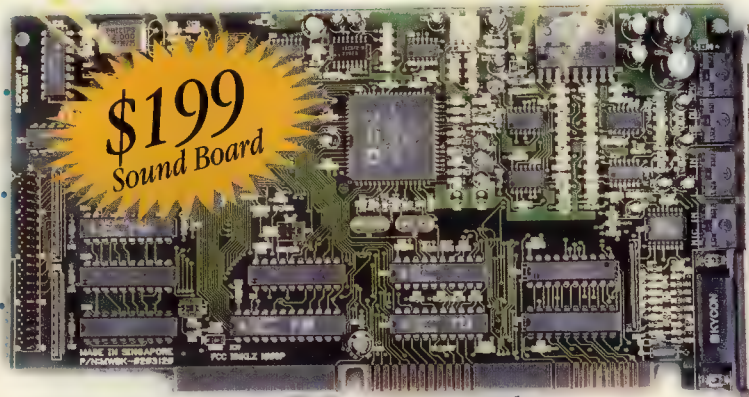
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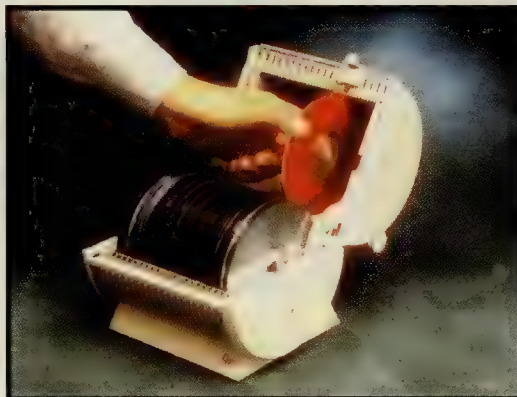
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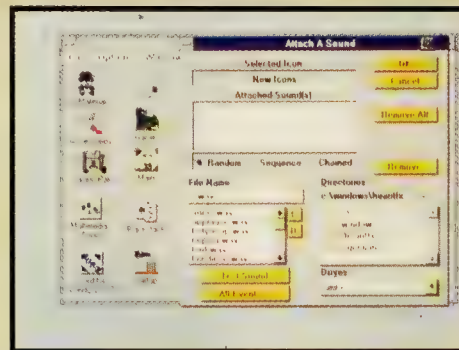
• Users of *Adobe Photoshop* (version 2.51) will find an added surprise from *Kodak*. The photography giant will equip the latest



SC&T's CD3 Compact Disc Storage System

*Photoshop* version with a plug-in feature designed to enhance the color and fidelity of Photo CD images when opened in *Photoshop*.

## Spare Parts



*Moon Valley's ROMaterial is a collection of animated icons, video clips, and screen savers on CD-ROM. This grab bag also contains audio samples in six different languages, some of which mimic the voices of famous people such as Ross Perot and Al Bundy. If you've been searching for an inexpensive (under \$20) package to jazz up your PC, check this one out. Moon Valley Software, 21608 N. 20th Ave., Phoenix, AZ 85027 (602) 375-9502*

Version 2.51 retails for \$895 — registered 2.5 owners receive free upgrades. *Adobe Systems, 1585 Charleston Rd., Mountain View, CA 94039-7900 (415) 961-4400*

• For those whose desktops

\$40.00. SC&T also makes a similar storage unit for 3.5-inch disks. *SC&T International, 3837 E. LaSalle St., Phoenix, AZ 85040 (602) 470-1334*

• *Cardinal Technologies'* new graphics accelerator, the *VideoSpectrumVL*, uses a *Cirrus 5428* accelerator chip to push color performance at 8, 16, or 25-bit color for *Windows* and *CAD* applications. The board carries a \$199 suggested retail price. *Cardinal Technologies, 1827 Freedom Rd., Lancaster, PA 17601 (717) 293-3000*

• Expect two big-name fall CD-ROM titles from *Interplay*. *Sim City*, the award-winning 1991 simulation, has been reworked for CD-ROM. *Interplay* used a 40-member film crew and a group of professional actors to spice up the original game, and is including 30 minutes of video. It's expected to ship in mid-



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*Hitachi's latest and fastest, the CDR-1900S*

October. In *Star Trek: The 25th Anniversary*, nearly every voice from the original cast has been included, and other extras have been added to the original disk-based game. It's slated for mid-November release. Both games will be released in DOS format.

*Interplay, 17922 Fitch Ave., Irvine, CA 92714 (714) 553-6655*

- **Hitachi** has announced the arrival of two new double-speed drives. Both models boast a transfer rate of 307.2 KB/sec and an access time of 250 ms. Each drive offers

horizontal or vertical installation and three-way caddy ejection (automatic, manual, or emergency). The CDR-1900S (external) carries an \$885 SRP, while the CDR-6700 (internal) lists for \$775. *Hitachi Home Electronics, 401 W. Artesia Blvd., Compton, CA 90220 (800) 369-0442*

- **Commodore**, an instrumental force in shaping the home-electronics revolution of the 1980s, is hoping for some revitalization with the Amiga CD32, a new game machine that employs a double-speed CD-ROM drive in its 32-bit game console. The CD32 debuted in mid-September, and is expected to list at

around \$400. Thirty games are slated to be available with the machine's release. *Commodore Business Machines, 1200 Wilson Dr., West Chester, PA 19380 (215) 431-9100*

- The **LaserWave Supra 16** is the first 16-bit sound board from Singapore-based manufacturer ACS. Among the Supra 16's features: advanced speech-recognition capabilities, a built-in AT or SCSI interface, and an MPU401-compatible MIDI interface. The \$219 suggested retail price also includes drivers for DOS and Windows, as well as bundled software. *(800) 282-5747*

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New Jersey - Micro Central 1-800-836-4276  
Texas - Daisytek 1-800-527-4212

**COMDEX Booth # 5047**



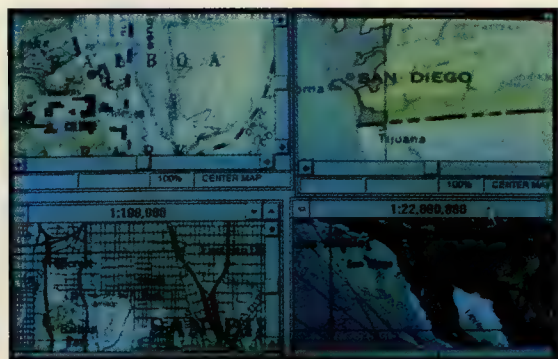
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Sure!MAPS

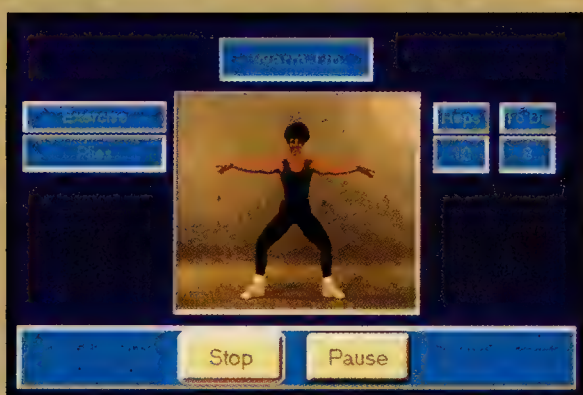
ROM for Windows boasts nearly 60,000 movie reviews and approximately 35 film clips

has updated the DOS version of its Sure!MAPS desktop mapping CD-ROM, and has released a Windows version. Sure!MAPS 2.0 employs raster mapping and point-specific geographic data, and carries a suggested retail price of \$199. Horizons Technology, 3990 Ruffin Rd., San Diego, CA 92123-1826 (619) 292-8331

● Here's a twist: a movie guide that actually contains movies. InfoBusiness' Mega Movie Guide Multimedia CD-

ranging from two to four minutes each. Clips include Hollywood greats like John Wayne, Elizabeth Taylor, and Cary Grant in some of their most celebrated performances. Mega Movie Guide also includes biographies of screen stars as well as a note-taking facility. A DOS/Windows version should be shipping within the next several months. InfoBusiness, 887 South Orem Blvd., Suite B, Orem, UT 84058-5009 (801) 221-1100

### Fit to Be Tried



Fitness Partner resembles a standard exercise video, until you check out some of its customizing features. After inputting personal data (age, gender, exercise habits, and fitness goals), the program drafts a workout plan best suited to your needs. There's also a Design mode, in which you chart your own course by "ordering" different exercises from an a la carte menu. Fitness Partner does suffer from a couple of problems, however — namely the small size of the on-screen trainer and the cheesiness of the electronic organ music. Computer Directions, 2712 W. Shaw Ave., Suite 234, Fresno, CA 93711-9945 (209) 435-7775

### Czechbook



Schumacher's New Prague Country Inn attracts gourmet palates to the Minnesota heartland. Schumacher's celebrated recipes (standard haute cuisine, Central European specialties, and wild-game dishes) have been collected on John Schumacher's New Prague Hotel Cookbook, from Quanta Press. This DOS/Windows CD-ROM also presents a simple slideshow and audio commentary from the chef himself. Of course, the real stars of the show are the recipes, which echo Schumacher's Czech heritage (i.e., Carpathian Meat Cakes, Classic Spatzle, and Rabbit Ostrava). Quanta Press, 1313 Fifth St. SE, Suite 223A, Minneapolis, MN 55414 (612) 379-3956

● You may not need every published phone number in the U.S., but Pro CD has compiled them for you just in case. Their seven-volume CD-ROM product ProPhone sells for \$449 (upgrades for \$129) and holds every American white page listing. Business listings also offer additional coded information about each business referenced. Pro CD, 8 Doaks Lane, Little Harbor, Marblehead, MA 01945 (617) 631-9200

● Contrary to what we first thought, CDs are not indestructible and can be damaged by fingerprints and scratches. Pleasant Associates is promoting disc-care products designed to protect and repair the reflective surfaces of compact discs. The Disc-Saver line includes restoring fluids and protectants, as well as anti-static wipes. Pleasant

Associates, 442-7 Daniel Webster Hwy., Merrimack, NH 03054 (603) 429-1412

● After producing a stable of traditional educational fare, Orange Cherry/New Media Schoolhouse is taking a lighter approach with its new edutainment release, King Arthur's Magic Castle. Although the goal is to convey an accurate impression of medieval life, Orange Cherry hopes that this Mac CD-ROM's heavy doses of whimsy will grab its intended youthful audience. Orange Cherry/New Media Schoolhouse, P.O. Box 390, 69 Westchester Ave., Pound Ridge, NY 10576 (800) 672-6002

● Last issue, we compared a number of different font collections on CD-ROM ("FONTasia," p. 66) and right after going to press, we received word on another such

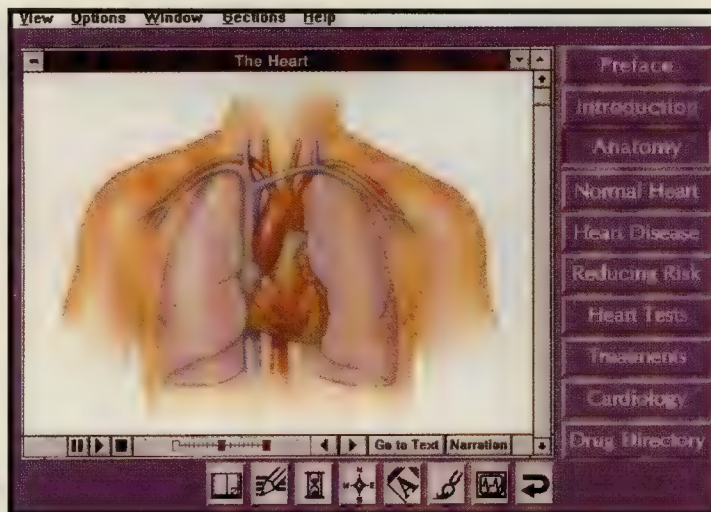


product. *Fantazia Fonts and Sounds*, from **Fantazia Concepts**, is billed as the largest collection of fonts available. This DOS CD-ROM contains more than 2000 fonts in TrueType and Adobe Type 1 formats, and 600 VOC files which can be played without additional software. *Fantazia Fonts and Sounds* normally lists for \$149, but has a limited-time offer of \$49.95. *Fantazia Concepts*, 35143 Vine St., Eastlake, OH 44095 (216) 951-5666

● **Crystal Graphics' *Crystal Flying Fonts!*** is a multimedia design kit for dressing up presentations and videos.

*Fonts!* enables users to create 3-D logos and title animations which can be stored and replayed. The package (\$295 suggested retail price) includes a bonus CD-ROM and runs on any 386+ PC. *Crystal Graphics*, 3110 Patrick Henry Dr., Santa Clara, CA 95054 (800) 394-0700

● Last issue we profiled **Interactive Ventures' *Mayo Clinic Family Health Book***. The follow-up product, *Mayo Clinic Heart Book*, is a multimedia CD-ROM version of the original 400-page text. Among its features are 3-D animations, a search function, and a symptoms guide. Both



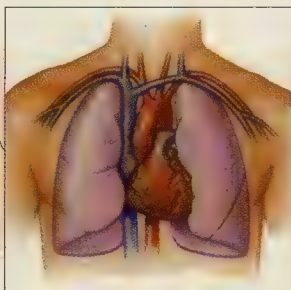
*Mayo Clinic Heart Book*

Mac and Windows versions are slated for October release. *Interactive Ventures*, 1380 Corporate Center Curve #305, Eagan, MN 55121

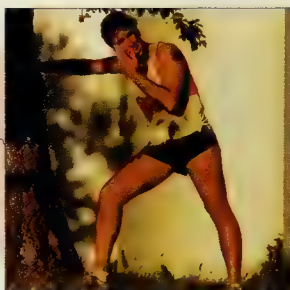
(612) 686-0779  
● Fans of horror master H.P. Lovecraft will be interested in *Shadow of the Comet*, a DOS-based CD-

# GET TO THE HEART OF THE MATTER

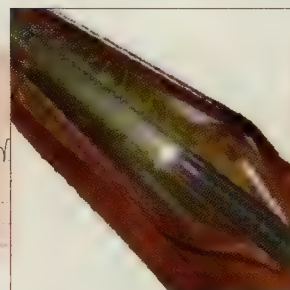
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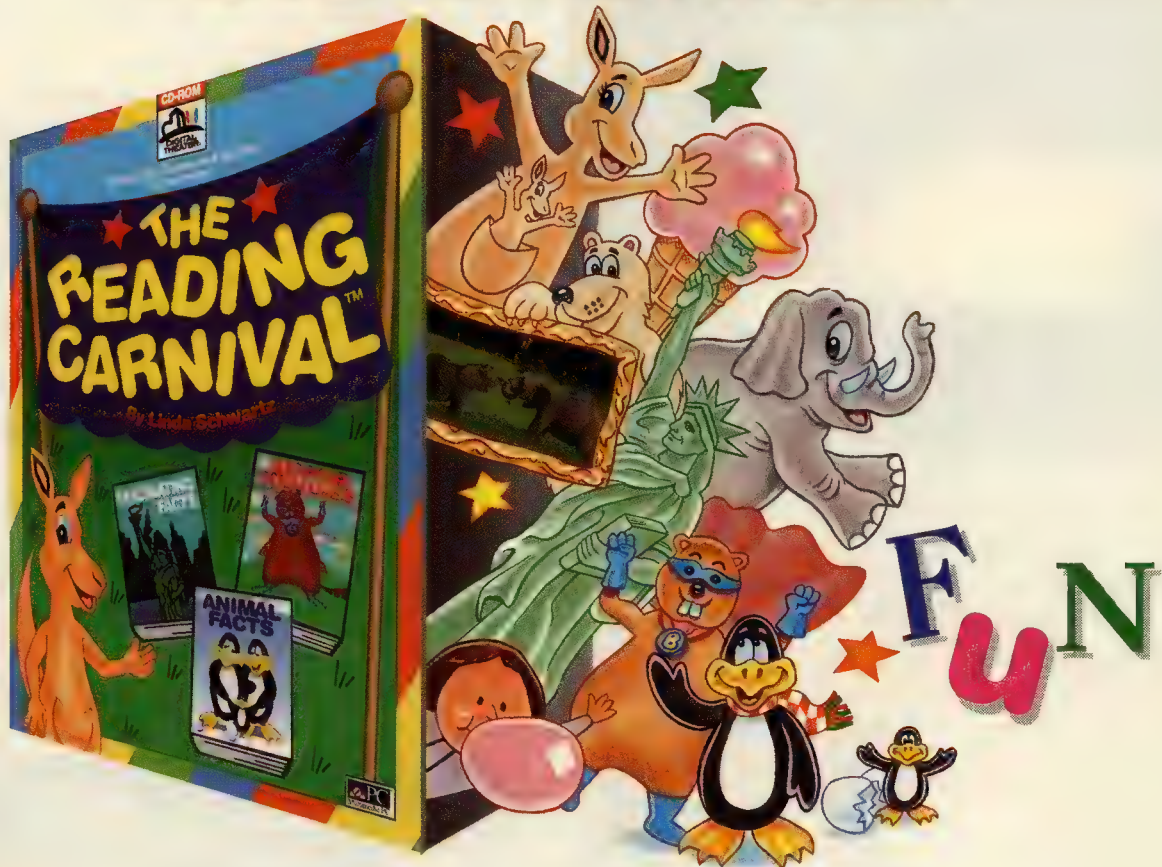


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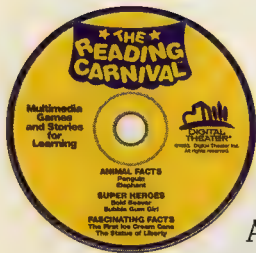


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The Reading Carnival™ is so much fun for boys and girls ages 6 - 10, they won't even realize how much they're improving their reading skills! At The Reading Carnival, your child meets new friends in 6 different animated stories, read aloud in children's voices. After finishing any Animal Facts, Fascinating Facts or Super Heroes story in this multimedia CD-ROM, the learning continues with 20 spelling and reading games and 20 screens of wild animal photographs. As a bonus, a spectacular coloring book lets your child color a picture on the screen and print it out as a present — just for you! After just a few minutes at The Reading Carnival, your child will be able to tell you how Bold Beaver saved the forest, the history of the Statue of Liberty, and even how to spell the word "penguin"! So . . . step right up to The Reading Carnival!



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ROM from **I.Motion**. Inspired by Lovecraft's writings, *Shadow* concerns a young astronomer investigating the strange events in a small New

from **Software Sorcery**, focuses on modern naval warfare, with historically accurate battles taken from recent conflicts like the



**Texel's latest CD-ROM drives: the external DM-5028 and internal DM-3028**

England fishing port. The adventure game, with approximately 40 characters and 150 settings, will be distributed by **Interplay** and is expected to ship in mid-December.

**I.Motion**, 1333 Ocean Ave., Ste. J, Santa Monica, CA 90401 (310) 576-1888

- **Wolfpack**, the popular submarine simulation, is coming to CD-ROM. **Novalogic**, publishers of the original best-selling disk version, has added new missions and enhanced graphics. *Wolfpack* players can either assume control of an Allied Escort Commander or command a German U-Boat. The simulation runs under DOS. **Novalogic**, 19510 Ventura Blvd., Ste. 200, Tarzana, CA 91356 (818) 774-0600

- Another DOS-based CD-ROM naval sim is on the way. **AEGIS: Guardian of the Fleet**,

Falkland Island War and Desert Storm. **Software Sorcery**, 6390 Greenwich Dr., Ste. 180, San Diego, CA 92122 (619) 452-9901

- **Texel** has joined the race for speed-demon CD-ROM drives. Each of its DM series drives transfers data at 335 KB/sec, with an average access time of 240 ms, and can be used for either PC or Mac. Both units are Kodak Photo-CD multisession capable and have automatic lens cleaners and dust-proof doors. The internally mounted DM-3028 sells for \$499, with the external DM-5028 retailing for \$599. **Texel**, 4255 Burton Dr., Santa Clara, CA 95054 (408) 980-1838

- If you've been looking to get into a multimedia PC for under \$1000, **Wearnes Technology** might be able to help. The *Beethoven MPC-1* is a fully-configured, Windows-

based system retailing for \$999. *Beethoven MPC-1* includes a Philips CD-ROM drive, the Beethoven 16-bit sound board, Labtec CS-150 speakers, and bundled software. Additionally, with a VGA-to-NTSC converter (available from **Wearnes**), video can be outputted to regular TV monitors for big-screen display. **Wearnes Technology**, 1015 East Brokaw Rd., San Jose, CA 95131 (408) 456-8838

- Planning for college takes much preparation by students and parents. **InterMedia's** new CD-ROM, *The College Counselor*, compares and contrasts 1600 four-year institutions across the U.S. Five-thousand financial-aid sources are also detailed, as well as career projections from the Department of Labor.

Users can also find personalized guidance from an online counselor. This Windows-based title runs optimally under the MPC spec.

**InterMedia**, Suite 302, 3624 Market St., University City Science Center, Philadelphia, PA 19104 (215) 387-3059

- Newcomer **MindPlay** recently launched its Educational Arcade CD-ROM line. Titles include *Kid-Fun* (junior karaoke for ages 3-8) and *Race the Clock* (a multi-level matching game with a time limit), both of which run under MPC. Each product is packaged with trading cards, posters, and coloring books. **MindPlay**, 3130 North Dodge Blvd., Tucson, AZ 85716 (602) 322-6365

- **WordStar** is setting its sights on the consumer market. The first offering from

## A,B...CDs from New Edutainment Publisher



Teaching kids to read is serious business, and newcomer **Digital Theater** is mixing business with pleasure in *The Reading Carnival*. This CD-ROM — the first in **Digital Theater's** series, *The Learning Carnival* — is geared for ages 6-10. It mixes six different stories with spelling games, reading quizzes, and problem-solving games. The *Reading Carnival* also features 60 screens of animal photography, and includes a 20-screen interactive coloring book. The product runs under Windows or DOS. **Digital Theater**, 5875 Peachtree Industrial Blvd., Suite 150, Norcross, GA 30092 (800) 344-8426



Build an insanely  
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drive it  
as fast as  
possible.  
And laugh  
in the face of  
authority.



*{Just don't cry when  
you're sharing a cell  
with a big fat guy who  
picks his nose.}*



The game has tons of cool video clips just like this one. Only different.



Break all kinds of laws in one of four European Racers. Integrated video clips give tips on equipment and weather conditions while you try to outrun the cops and race on four different tracks. 3-D animated instructions help you build a model of your car so you can remember what it looks like after you wrap it around a guard rail. Available for IBM on CD-ROM and Sega CD.



**The model makes the game better. The game makes the model better.**

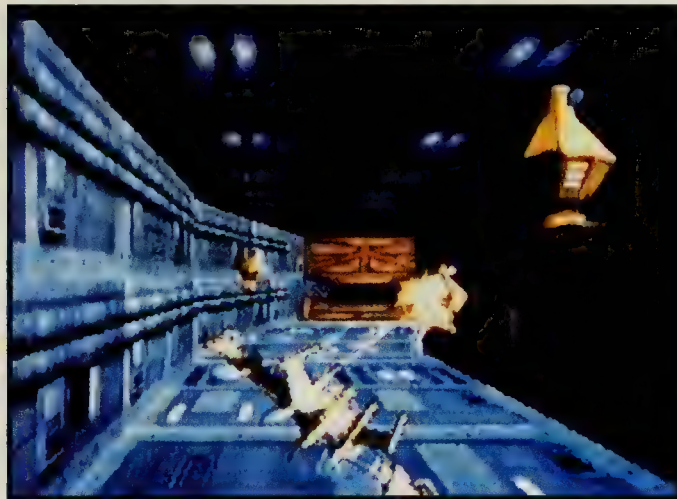


its newly formed StarPress Multimedia Division is *The American Heritage Dictionary, Third Edition*. Recently revised for the first time in over a decade, *AHD III* contains 10,000 new words. The CD-ROM will ship in Windows, DOS, and Mac versions. StarPress will also publish *Leonard Maltin's Movie and Video Guide* and *Webster's New World Encyclopedia*. WordStar International, 201 Alameda del Prado, Novato, CA 94949 (415) 382-8000

- **Megamedia Computer's** latest offering is the Mega Multimedia Upgrade Kit. For \$799, users receive a Toshiba double-speed internal CD-ROM drive, Pro Audio

Chinon has announced three new double-speed drives, an internal and external model for PCs, and an external Mac drive. The CDX-535 series (300 KB/sec transfer rate, 250 ms access time) contains extras like a 256 KB cache (which Chinon claims is the largest data buffer of any CD-ROM drive) and two SCSI ports. Also, the CDX-535 series can read all Mac discs with the addition of a \$99 Mac driver. Chinon's CDX-535 retails for \$895. Chinon America, 615 Hawaii Ave., Torrance, CA 90503 (310) 533-0274

- **Crystal Dynamics** recently celebrated its first anniversary by taking on new partners, including one



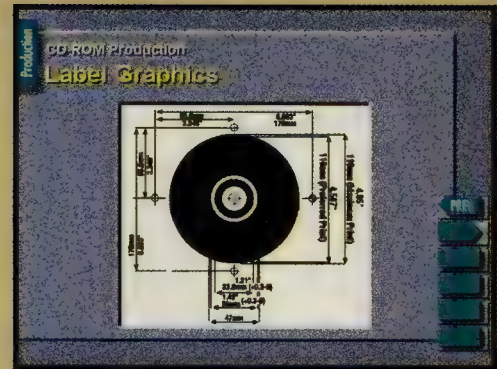
**Total Eclipse**

Spectrum 16 sound card, and a pair of magnetically shielded stereo speakers. Also bundled are *Grolier's Multimedia Encyclopedia for Windows* and *20th Century Video Almanac*. Megamedia Computer, 1701-D Fortune Dr., San Jose, CA 95131 (800) 634-2633

- **Double-Speed Update:**

noteworthy cable service. HBO, a division of Time Warner, joins a group of investors backing Crystal Dynamics. The company has two products slated for fall release — *Crash 'N Burn* and *Total Eclipse*, both for 3DO. Crystal Dynamics, 2460 Embarcadero Way, Palo Alto,

## MPC Tour Guide



Zone Publishing is hoping to remove some of the mystery from multimedia by taking newcomers (and experienced hands, too) on The Guided Tour of Multimedia. Set up as both a tutorial and reference guide, this MPC program is split into six chapters, covering everything from computer basics to multimedia production. As you might expect, there's an abundance of video, sound, and animation. Though The Guided Tour can drag a bit (particularly for the more knowledgeable user), the information is thorough and clearly presented. Zone Publishing, 38 Corporate Park, Suite 100, Irvine, CA 92714 (800) 942-4000

CA 94303 (415) 858-4990

- **Packard Bell's** new PBTv3 is an add-in card that allows you to input television signals from any video source. Besides watching television while performing computer tasks, PBTv3 lets you capture, store, and print video images. The PBTv3 (under \$500) can also be programmed for operation much like a VCR. Packard Bell, 9425 Canoga Ave., Chatsworth, CA 91311 (818) 886-4600

- **RomTime's** DOS-based CD-ROM *Hyper-Backgammon* uses significantly fewer pieces than the traditional game, and pits you against a computer well-versed in the art of calculating just the right move. The resulting game, its manufacturers claim, is both faster and more exciting than the original. RomTime, 8601

Wilshire Blvd., 8th Floor, Beverly Hills, CA 90211 (310) 659-6703

- **Digital Vision** has announced price reductions on its ComputerEyes/RT grabber and ComputerEyes/Pro digitizer. ComputerEyes/RT has dropped from \$599.95 to \$399.95, while ComputerEyes/Pro is now being offered for \$299.95 (down from \$399.95). Digital Vision, 270 Bridge St., Dedham, MA 02026 (617) 329-5400

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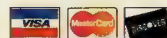


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- CD caddy and SCSI cable
- CD software: Kings Quest VI

**PC2**  
Multimedia PC





## Coming Soon to a CD-ROM Near You

**A** lot can happen in a summer. Only late last spring, when I wrote my first VideoView column for *CD-ROM Today*, putting feature films on CD-ROMs was a typical chicken-and-egg problem. The technology existed to allow near-VCR-quality full-screen video at CD-ROM data rates — MPEG I video compression — but no one was producing discs because there were no MPEG-equipped players. And no one was selling players because no discs were available.

Software-based video technologies like Apple's QuickTime and Microsoft's Video for Windows are a simpler matter. They're designed to play back video clips on ordinary personal computers and don't require special decoders or adapters. CD-ROM publishers have been quick to put video clips on discs, but the software-only approach limits the quality of the video playback. With more sophisticated data-compression algorithms, video quality might be higher, but more involved algorithms would also need more processor power to decode and display the data. The video might get better, but fewer computers could play it.

To date, most software video clips are run at 160 x 120 pixels, at a rate of 15 frames per second. Not so bad for illustrating a hopping kangaroo in a CD-ROM encyclopedia, but it's a long way from the television we're used to. Newer, more efficient compression algorithms like SuperMac's Cinepak and Intel's Indeo 3.0 support faster frame rates or higher resolutions (up to 320 x 240), but they still can't put VCR-quality video on a CD-ROM.

### The Format Came First

Several developments this summer could change that whole picture. Most important is the proposed Video CD format, a universal system for storing high-quality digital video on CD-ROMs. JVC and Philips announced Video CD in June, with backers including Paramount Home Video, Goldstar, and Samsung. And Sony and Matsushita have been quoted as expressing "keen interest" in the format.

Video CD discs will use MPEG I video compression, a popular international standard for high-quality compressed audio and video. MPEG I, developed by the Moving Picture Experts Group (not "Motion," as I identified it last time), a Working Group of the International Standards Organization

(ISO), was adopted as a standard a year ago. But unlike the compression methods used in QuickTime and Video for Windows, the complexity of MPEG I compression means that special chips are needed to decode the data.

The idea of putting MPEG I video on a CD-ROM didn't originate with Video CD, but Video CD spells out the sundry details of storing video data on a CD-ROM. Video CD ensures that everyone records their MPEG discs the same way, so that one company's Video CD will play on another vendor's player. Introducing a new media format in the consumer electronics business is always a chancy move (recall the collective yawn with which consumers greeted DAT, Minidiscs, and Digital Compact Cassettes), but having a standard format for CD movies might help break the chicken-and-egg deadlock.

The promoters listed four different types of systems that will be able to play Video CDs. Some existing audio CD players can be upgraded with a Video CD adapter, from either the original manufacturer or an aftermarket supplier. Computers with CD-ROM drives need only MPEG decoding hardware. Interactive multimedia players, like Philips' CD-I and the upcoming 3DO system, will be offered with optional Full-Motion Video hardware. And finally, dedicated Video CD movie players are expected from Samsung and others.

Excepting the single MPEG chip and a few video circuits, Video CD machines would hardly differ at all from ordinary audio CD players. The CD-playing mechanism is a model of simplicity compared to the VCR's tape-transport system, and an MPEG decoder is a fairly simple piece as processor chips go. While the first models are expected to be in the \$600-\$700 range, Video CD players could eventually be much cheaper than the lowest-priced videocassette decks. And they could be much smaller, too, making paperback-sized players an attractive possibility.

It's important to note that there are tremendous differences between all these different kinds of platforms, and Video CD compatibility only covers ordinary linear movies. It doesn't apply to games, reference titles, or any other type of interactive, non-linear CD-ROM.

If an interactive CD-ROM for PCs includes Video CD format video clips, the other systems might be able to play







the Video CD portions, but the interactive parts would only work on PCs.

### A PC Solution

One other participant in June's Video CD announcement was a young company by the name of E-Motions. Several weeks before the announcement, E-Motions surprised a number of attendees at Summer CES, where several software publishers were running upcoming titles through E-Motions' ReelMagic board. This moderately priced add-in card allowing high-quality full-screen, full-motion video on PCs turned a lot of heads. ReelMagic includes an MPEG decoder with video overlay and video-in-a-window capabilities, and it's also a SoundBlaster-compatible sound card. According to E-Motions, the ReelMagic card will include software to play Video CDs in both DOS and Windows environments.

But interest in the card isn't just limited to Video CD movies. Already, a growing list of publishers are preparing full-motion MPEG video for some of their CD-ROM products.

Activision, Aris, Interplay, Psygnosis, Readysoft, and Sierra are among those readying titles that take advantage of the ReelMagic card.

And just as we neared deadline, we received word that video-card manufacturer Sigma Designs had acquired E-Motions. According to early reports, the board will keep the ReelMagic name, and E-Motions will benefit from Sigma's excellent marketing and distribution channels. The boards should be available in October with a street price of under \$400, and will also be bundled with double-speed CD-ROM drives, SCSI cards, and several CD-ROM titles in the \$600-\$700 range. Look for more on ReelMagic next issue.

### What's the Point?

A natural question at this point is "Who needs it? Why are they putting movies on CDs when we already have video cassettes?" There are several good reasons, some of them

having to do with cost. CDs are remarkably simple and inexpensive to manufacture, a fraction of the cost of prerecorded videocassettes. CDs also last longer than tapes, don't wear out as they're played, and are rugged enough to tolerate mishandling.

These factors are all important to movie-rental businesses, and they might help to make Video CDs available in rental stores. (So might the fact that Video CD sponsor Philips owns about 20 percent of Blockbuster Video.)

Video CDs could also offer a great deal of convenience. Skipping to any part of a disc can happen almost instantaneously, and a Video CD would, of course, never need to be rewound. The smaller packaging to contain a CD uses less shelf space, both in stores and at home,

and costs less to ship. And while VHS tapes must be made in separate NTSC, PAL, and SECAM versions for different national markets, Video CDs are designed to work with all worldwide TV broadcast standards.

There's one drawback

though: Video CDs have the same data transfer rate as audio CDs, so they also have the same 74-minute maximum playing time. Since nearly all contemporary films are longer than 74 minutes, a movie will come on two Video CDs, three for films longer than two and a half hours. If you don't have a CD changer to hold the discs, you'll have to get up and change it yourself. Then again, after 74 minutes, it might be time to make more popcorn anyway.

At least one major entertainment player thinks the idea is a winner. Paramount has announced plans to offer Video CD versions of many of its top films this fall, with same-day releases of many new titles on both disc and videotape. The discs will be distributed by Philips as part of its launch of Full-Motion Video adapters for CD-I players.



*Two important developments this summer — Video CD and the new ReelMagic board — could change the whole CD video picture....*





## More On the ABC's of Sound Cards

**I**n our debut column last issue, we outlined the history of PC sound cards and laid out the basic differences between 8-bit and 16-bit sound. If you're in the market for one of these devices, however, there's more than sample size to consider. Compatibility, sampling rates, and MIDI and compression capabilities should also guide your purchasing decision.

### Compatibility

In the world of sound cards, "compatibility" means that a card works with the Ad Lib and Sound Blaster standards. If you want to play games with half-decent sound, you'll need a card compatible with one of these standards. Another important issue these days, though, is compatibility with Windows. Your card doesn't have to be Ad Lib or Sound Blaster compatible when it's working in Windows, as long as it provides its own Windows sound drivers (check the package to make sure).

One other point worth checking is ease of installation under Windows. Ideally, your card will install its own drivers into Windows, but this will happen only with some cards, and only if you've never had a different sound card running under Windows. If you have, be prepared for some very ugly fiddling with the SYSTEM.INI and perhaps CONTROL.INI files. It can be very time-consuming and frustrating — let's hope manufacturers finally figure out how to make this Windows installation process a lot easier.

### Sampling Rates

Last issue, we covered sampling sizes: 8-bit vs. 16-bit. Sampling *rates* are a different (but related) issue, and one you'll see emphasized on sound-card packages.

The sampling rate is the number of times per second the sound card adds sound descriptions to the .WAV file. It's expressed in kHz, so the number is actually multiplied by a thousand. (A sampling rate of 44.1 kHz equals 44,100 cycles per second.) This is the highest sampling rate you'll find.

MPC compatibility requires that your sound card can record mono .WAV files at a minimum 8-bit sampling size with an 11.025 kHz sampling rate. It also

requires that the card play them back at double this rate, 22.05 kHz. But the music found on audio CDs has a 16-bit sample size and a 44.1 kHz sampling rate, and this is what the top sound cards now supply. Some cards record at one maximum rate and play back at another lower rate, and this is fine for those who don't intend to do much recording.

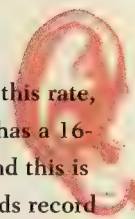
If you do want to record, and you know you need CD-quality sound, you'll need a huge hard drive. Two seconds of 16-bit stereo sound, sampled at 44.1 kHz, can use up more than a megabyte of your hard-drive space! Mono sound will decrease the file size, as will a lower sampling rate and a smaller sampling size. Make sure your card gives you a choice.

### MIDI

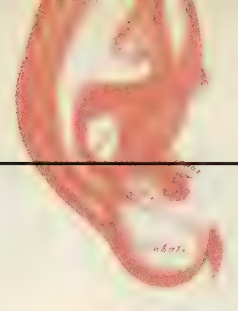
MIDI is an acronym for Musical Instrument Digital Interface, but that doesn't matter — the term is now so well-known that just saying it will get you what you need. MIDI is about as close to a true software/hardware standard as computerdom has seen, adopted in the early 1980s by the electronic music industry and still powerful enough to continue being a standard.

A MIDI file consists of playing instructions for an electronic instrument. MIDI data tells the instrument exactly which notes to play, and exactly which instrument sounds to use to play them. Basically, it's a small program, with the emphasis on small — one of MIDI's major attractions is that its files (.MID) are much smaller than .WAV or other file types you'll find on your computer. The reason, essentially, is that a .MID file stores instructions, while a WAV file contains representations of sounds themselves. One minute of music in a .MID file might occupy only about 12KB of your hard drive, while the same minute in a .WAV file can chew up 10 megabytes!

So why not use MIDI for everything? Because the sound you get from a MIDI file depends entirely on the quality of the synthesizer through which you play it. And, for the most part, the MIDI synthesis on PC sound cards isn't as good as on a dedicated MIDI machine. Most sound cards use an FM synthesizer chip to reproduce







MIDI sounds, because these chips are inexpensive additions to the board. But FM synthesis can simulate only simple instrument sounds accurately, failing miserably with any kind of complex harmonics. FM synthesis treats instrument sounds as simple sine waves, using a system of *operators* to modify and enhance these waves. An FM chip with four operators, such as the Yamaha OPL3, provides richer sounds than one with two operators, such as the more common OPL2 (also from Yamaha), but the results are nowhere near real instrument quality.

The other method of synthesis is called *wavetable synthesis* (based on digital sampling).

Much more sophisticated than FM synthesis, wavetable synthesis produces sound from audio samples that are either stored in the board's built-in memory or loaded from your hard

drive. Essentially, FM synthesis simulates sound, while wavetable synthesis reproduces sound. Unfortunately, wavetable synthesis chips are more expensive than FM synthesis chips, and as a result fewer sound cards use them (but more are on the way).

Three more points about MIDI should be considered. First, your card will support a specified number of *voices*; this refers to the number of sounds your synthesizer can play at any one time. Many cards offer 20 stereo voices, or roughly the equivalent of a 20-piece simulated orchestra, but a few dip as low as 11 or rise as high as 32. Second, see if the board comes with MIDI ports to let you hook up to an external MIDI synthesizer. This is crucial if you want to do any serious MIDI composing — using a synthesizer's piano-style keyboard is much easier than using the computer's keyboard. Take note also of whether or not you'll need a MIDI adaptor add-on to attach the keyboard. Finally, look for a MIDI sequencer program included with the sound board; not

many have it, but if you want to write or edit MIDI files, you'll need one.

## Compression

ADPCM isn't nearly as pronounceable an acronym as MIDI, but you might as well get used to it. It's slowly but surely becoming something of a standard for real-time sound compression, a technology designed to counteract the problem of non-MIDI sound files being so huge. ADPCM stands for Adaptive Differential Pulse Code Modulation, which, of course, doesn't really explain

anything. The important point is that it's one system of data compression for sound files, and well on its way to becoming an important consideration in sound-board development.

Look for ADPCM compression (or at least some form of compression), but be aware that

*Be sure you know what sampling rates mean. Some cards record at a maximum rate (44.1 kHz) and play back at a lower rate — but this is fine for those not producing their own sound and music.*

there are two significant problems with it. First, files lose a small portion of their data when compressed, which means they lose some of their fidelity. For this reason, compression is best used for voice files or other sound files where sound quality is less important. Second, the standard doesn't exist yet, so an ADPCM-compressed file from one computer won't necessarily work on another computer. If you plan to transfer sound files from one machine to another, make sure you can save them in uncompressed format.

One technology appearing on many newer sound cards is the DSP (Digital Signal Processing) chip. Designed to expand the capabilities of even the lowest-end sound equipment, basically by taking on some of the work themselves, DSPs also include on-the-fly compression and decompression of files. The result is a possible 4:1 compression ratio, but again there is no standard to date.





## Hands On





# The compact disc brings to your PC the amazing storage capacity of a huge hard disk drive, but with all the speed of a floppy disk. For less than \$100 (and some spare RAM), a cache program can juice up your CD-ROM performance better than any hardware upgrade.

# Speedy CDs: 4 Caches That Optimize Your CD-ROM Drive

Charles Brannon

True, the massive size of the sound clips, detailed artwork, and animation on CD-ROMs can make the whole operation seem sluggish, even downright sleep-inducing at times. To keep up, the standard MPC-I drive has been improved by the popular double-spin MPC-II drive. State-of-the-art drives now offer *quadra-spin*. That's right — four times as fast. Even the best CD-ROM drives are still much slower than your hard drive, which is anywhere from a dozen to a hundred times quicker.

Fortunately, CD-ROM software developers work within these limits to make CD-ROMs "play" as responsively as possible. When that's not enough, you may want to consider a powerful performance-boosting software utility: a cache. We'll evaluate four hard-drive/CD-ROM caches: *Norton SpeedCache+*, *PC-Kwik PowerPak*, *Lucid's Lightning*

*CD*, and C&D's *CacheAll*.

## What's a Cache Good For?

You may already be using a cache now with DOS 5.0, 6.0, or any version of Windows. Each of these operating systems offer SmartDrive, a DOS enhancer which sets aside some of your RAM as a *buffer*. When your computer reads from the hard drive, SmartDrive stashes a copy of the data in the buffer. If a program needs the same piece of data again, the cache first checks to see if it's already in

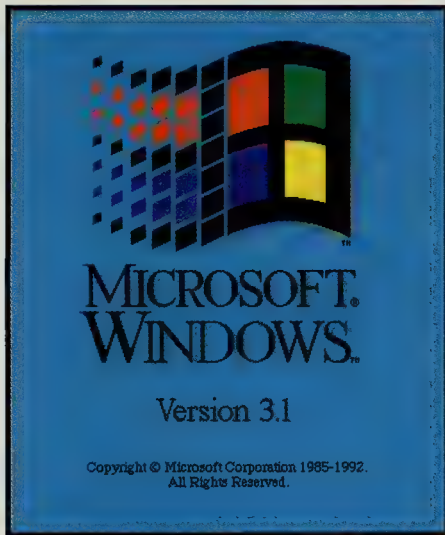
the buffer. If the buffer is large enough, the most recent data will be there, saving the time it takes to find the data and read it from the hard drive.

A good caching program actually stores only the most frequently used data in the buffer, and won't necessarily store new data in the cache until it gets accessed often enough. Data read from the cache (a cache hit) can be thousands of times faster than if the same chunk had to be read from disk every time. Even an extra-speedy hard drive is slow compared to RAM — just think of how much faster it is when applied to the even slower CD-ROM.

A cache also saves wear and tear on your drive, since it prevents constant seeks as the drive tracks its heads all over the disk trying to find scattered data.

Used with files on a hard drive, the *write-delay* cache offers even greater savings. Instead of writing to disk immediately, the write-delay cache can save up a bulk list of changes, sort it, and write the changes to disk in the most efficient manner possible.





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Redundant writing can also be avoided. When possible, it writes these changes "in the background" even while the main program appears to be finished — but if you watch the drive light, you'll see it flicker a little while the rest of the file is written. That should warn you to be careful.

### What's the Catch?

If your machine crashes or locks up, the remaining bit of data left in the write-delay cache will never get a chance to be saved. In many cases, this won't do much harm — you'll just find that a few changes never happened the next time you open the file. In the worst case, the file could be corrupted, or simply lost. When using the write-delay option, never turn off your computer or reboot until your drive LED stops blinking, even if you're at the DOS prompt.

If you have a very stable computer or a well-honed

Windows setup, using a write-delay cache can be hard to resist, since it speeds up your system considerably more than an ordinary cache. But if you have flaky hardware, run buggy software, or have come down with a case of the Windows blues, you'll want the ability to disable this tricky but useful aspect of your disk-caching software. All

the products evaluated here which support write caching allow you to disable it. In addition, all of the caches covered in this article support a *flush* option, which empties the cache, immediately committing any pending writes to disk. (Handy right before you power off, especially if you're either paranoid or obsessive-compulsive.)

### Where Speed Really Counts

Microsoft's SmartDrive is one of the best hard-drive caches you can get for your money. Actually, it's free, if you bought DOS 5.0, 6.0, or versions 3.0 or 3.1 of Windows. For all its prowess, though, SmartDrive only caches floppy disks and hard drives — not CD-ROMs — yet nowhere is caching needed so badly than with CD-ROMs. So it's probably worthwhile to substitute a third-party cache if it offers good CD-ROM caching.

You'll need a fair amount

of memory to be able to make good use of a CD-ROM cache. While a 512K SmartDrive cache may do you some good, remember that your hard drive is much smaller than a CD-ROM. You'll need a proportionately larger cache to get good results with a CD-ROM.

The ideal size for a hard-drive cache is two megabytes, but you need at least six MB of total RAM in your computer to make this practical if you want to run Windows properly (Windows runs best with at least 4 MB of RAM). You'd have to limit the cache size to one MB or less if you want to run Windows on a four-MB machine. However, for a CD-ROM cache, performance benefits start at one MB, and aren't really impressive without at least two MB. A four-MB cache is even better. Most caches let you use all your memory for the cache, and share or lend parts of it on demand to other memory-hungry programs, such as Windows.

Here's a rundown on each of the four caches. Following this, we'll look at how they compare, and we'll see the results of several benchmarks.

### The Norton SpeedCache+, Version 4.0

No frills or bonus utilities here, just a solid, fast cache. It's faster than SmartDrive for hard-drive caching, and can use up to 23 MB of RAM for the cache (yet can still free up memory when running Windows). You can optionally install *SpeedCache+* in CONFIG.SYS to speed up booting, but it will use up more DOS memory than if you start it from AUTOEXEC.BAT. Depending on your computer, you can set it up so that it runs fastest (the default), most efficiently (using the least memory, if you don't have tons of RAM), or in between. This saves you from having to hand-tune numerous other settings.

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### Lightning CD

*Lightning CD*, like *PC-Kwik PowerPak*, comes with a grab-bag of goodies: DOS utilities that speed up your text screens, make your keyboard repeat faster, offer a blanking screen saver, let you delete entire directories (same as DELTREE in DOS 6.0), and even show your drive busy lights on-screen. However, none of these tools are useful if you run only in Windows.

The package we reviewed included a bonus CD titled "The Best of the Bureau," a multimedia compendium of history and literature from the Bureau of Electronic Publishing. It's a good way for you to judge for yourself the value of the cache. Lucid offers a 30-day, no questions asked, money-back guarantee if



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### PC-Kwik PowerPak

The powerful cache (*Super PC-Kwik*) in this package is nearly dwarfed by the wealth of other utilities included. These include a tool to speed up text display and scrolling (with automatic screen blanking if desired, flicker reduction, and a way to scroll backward for review), improved keyboard response with increased repeat rate and enlarged type-ahead buffer, a full-featured print spooler (a kind of cache for your printer), improved DOS command-line editor, powerful disk defragmenter, and customized start-up configurations. These tools work together, sharing a common memory pool for the use of the PC-Kwik cache, the scrollback buffer, DOS command-line recall buffer, and RAM disk (which simulates a disk drive using fast RAM). This pool can be as large as available memory — up to 16 MB — yet shared on demand with DOS applications and Windows.

Most of these utilities aren't worth a lick if you only use Windows (although they are available within DOS sessions running under Windows). It's possible to use the cache by itself, adding only

the tools you find useful.

#### PC-Kwik Corporation

15100 SW Koll Parkway  
Beaverton, OR 97006-6026 (503) 644-5644

**\$80.00 SRP**

### CacheAll

*CacheAll*, while swift, can't boast superior hard-drive caching. One reason: It doesn't support the write-delay feature discussed above. Yet it has some unique features that put it in a class of its own. First, it can co-exist with SmartDrive, so you can let *CacheAll* devote itself to your CD-ROM drive. Second, it's the only cache, to our knowledge, that can speed up access to network files (!). We found that it did indeed speed up network access, though more noticeably with DOS applications than with Windows. (It speeds up the entire network by reducing file-server and network traffic.)

Third, in addition to caching to RAM, it can use a hard-drive *swap file* for extra space. You're familiar with swap files if you use Windows — they're blocks of disk space that allow the computer to simulate RAM, though more slowly. Since your hard drive is still much faster than your CD-ROM, this lets you have a big cache even if you don't have much RAM.

#### C&D Programming

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## See How They Run

When comparing utilities like these, it's common to employ a single objective testing program, or benchmark. However, it's difficult to create a single fair benchmark, since most utilities are built on unique strategies. Also, the kinds of numbers generated by a benchmark, although handy for comparing disparate systems, aren't meaningful in themselves.

*Application benchmarks* are more appropriate, since they are closer to the the kind of real-world, day-to-day way you use your computer. With an application benchmark, you simply measure the time it takes to perform common tasks, like opening a document. Our tests are performed with popular software titles and cover a good range of common tasks, without being too complex and intimidating. The results are shown in Table 1. As you'll see, most of the caching programs gave similar results, but we'll leave the final judgement up to you.

## What We Tested

*The Adventures of Willy Beamish* (Dynamix) was selected as a representative DOS game, featuring gobs of sound and music, background graphics, and animation. We timed three primary branching points: starting the game from DOS, jumping to the introduction, and moving straight to the start of the game. Although all caches performed better than SmartDrive (which, again, has no CD-ROM support), they all worked nearly the same. It's not unusual for a clever programmer to build some cache functionality into the game itself, but even so, these caches roughly doubled the speed.

We're using SmartDrive as the control, instead of no cache at all, since we're trying to separate the CD-ROM boost from that provided by hard-drive caching, and SmartDrive does perform hard-drive (but not CD-ROM) caching.

*Compton's Multimedia Encyclopedia* was chosen as a Windows-based program that functions like a database. We searched for "treasure" (using Idea Search), then searched again for "buried treasure." The first test yielded a modest improvement, but the second search was up to 500 percent faster, since some of the articles were still in the cache.

We then tested how long it took to start *Corel Draw 4.0* from the CD-ROM, and followed that up by importing a piece of clip art. *Corel Draw* started about 60 percent faster than normal, but none of the caches were able to speed up the clip art: the first (or only) time you read a file, it has to be read from the disc at normal speed.

We wrapped up the scenario by comparing basic hard-drive caching, and since all caches except for *CacheAll* replace SmartDrive, they had better be at least as fast. Starting



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## Our Wackos Change It Here

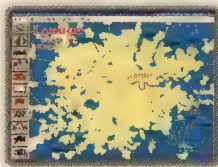


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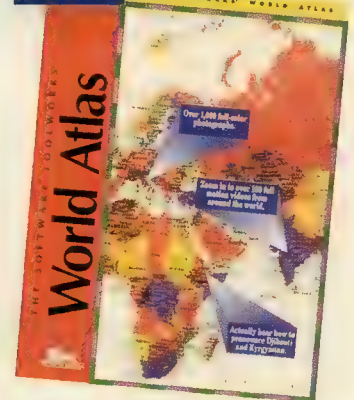
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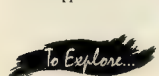
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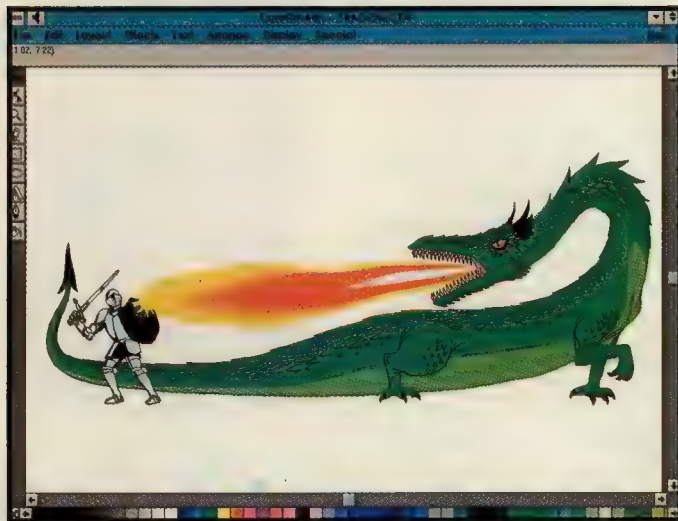
**TABLE 1.** "Real World" CD-ROM Caching Test Suites

	SmartDrive 2Mb	SpeedCache 2Mb 4Mb	PC-Kwik 2Mb 4Mb	Lightning 2Mb 4Mb	CacheAll 2Mb 4Mb 8Mb
<b>Willy Beamish</b>					
To Startup Screen	13	10 10	10 10	10 10	10 10 10
Jump to Intro	9	4 4	4 4	4 5	4 4 4
Directly to Game	16	8 8	9 9	9 10	9 9 9
<b>Compton's Encyclopedia</b>					
Search for "treasure"	13	8 7	8 8	10 10	8 8 7
Then, search for "buried treasure"	22	5 4	5 5	8 8	6 5 5
<b>Corel Draw 4.0</b>					
Start Corel Draw from CD-ROM	63	39 38	42 41	44 42	41 41 40
Import "dragon.cdr" from CD-ROM	15	15 11	14 14	16 15	15 15 14
<b>Hard Disk Only Tests</b>					
Start Microsoft Windows 3.1(70s)	38	35 35	34 34	35 33	54 52 52
Start Lotus Ami Pro	10	11 11	11 11	12 11	16 15 15

Results (in seconds) of real-world caching tests

Windows is a good test, since it reads dozens of files, often repetitively, during startup, and staring at the Windows logo is one of the most annoying pauses you'll

encounter. All programs except *CacheAll* held water in this department, and offered decent improvements in starting Lotus' *Ami Pro* word processor.

**DRAGON.CDR** is a Corel Draw 4.0 file used for benchmarking (see Table 1).

*CacheAll* was tested with a variety of settings to try to improve its performance as a hard-disk cache (it works very well as a CD-ROM cache). It was also entered into the contest a third time using an extra four-MB swap file, since one of its unique features is to use hard-drive swap files. And it did improve on the 70 seconds required to start Windows using no cache at all.

The other caches were also tested competitively. The default settings were tweaked up for better performance. For example, *PC-Kwik* was allowed to use write-delay caching since *SpeedCache+* and *Lightning CD* use it by default.

You can see there's not much difference between using a two-MB and four-

MB cache, a result that surprised the author. But these tests were done in isolation, flushing the cache between each test, so cumulative results should be noticeably better with a larger cache. Also, the test system has a Texel double-spin CD-ROM drive, similar to that now being bundled with multimedia computer systems. If you own one of the standard MPC Level I drives, you'll notice an even greater improvement.

You may wonder, "What's the big deal about a few seconds here or there?" As you continue to run your application in one sitting, it will get increasingly faster, as the cache gets a good statistical profile of your data, and offers it up ever faster, as much as three times faster than without a cache. Those seconds soon add up to minutes, which over the course of a day can mean the difference between sweet composure and hair-pulling frustration.

### What About Video?

The advent of Microsoft Video for Windows (and its cousin, Apple's QuickTime) has further piqued the demand for faster computers, high-performance graphics cards (on a local bus, if you please), and ever-speedier CD-ROM drives. Unless you're



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satisfied with postage-sized TV pictures, you'll have to improve in one or more of these areas. But if you think a cache will help here, think again. All four caches (tested with Aris's *MPC Wizard 2.0*) actually slowed down the computer enough to *reduce* the frame rate (using Intel's Indeo format). The smidgen of time it takes to store frames in the cache gets in the way of a video technology that has to squeeze every drop of speed out of your computer. This is even true on a 486DX/33 test system with an S3 accelerated video card and 16 MB of RAM.

The only cache that improves things slightly is *CacheAll*, with its eight-MB

cache (four MB RAM, four MB swap file). This allowed the entire video to fit in the cache after the first playing, and it played back at nearly full speed. Nevertheless, you'll want to disable the cache when using multimedia applications that play videos.

Table 2 summarizes the features and distinctions of the four caches reviewed here (even SmartDrive gets a word in). A few notes: "Makes changes to Windows setup" refers to a small change (VirtualHDIrq=off) that *SpeedCache+* and *PC-Kwik* make to your Windows SYSTEM.INI file. This allows better background disk writing, but can slow down Windows slightly if you ever

go back to using SmartDrive. Your SYSTEM.INI file is backed up, though.

The Write-Delay Caching column in Table 2 lets you quickly reference which caches support this useful, but tricky feature for speeding up disk saves. ON means that that write-delay is not only supported, but is the default option. *PC-Kwik* turns this OFF normally, but you can elect to turn it ON.

### Caching It In

Recently, memory prices have begun to climb — still, they're at a record low historically (even compared to a year ago). There is no better way to spend money on improving your computer than adding memory. And there are few better uses for your extra memory capacity than setting some of it aside for hard-drive and CD-ROM caching. If you don't have much extra memory, buying a cache will persuade you to get some more, since higher performance is always alluring. Perhaps you've seen ads for expensive disk controllers with on-board RAM and built-in hardware caching, or for high-end CD-ROM players with one-MB buffers and SCSI-2 interfaces. It's gratifying to know that computer RAM combined with caching software will actually be faster than these specialized hardware solutions, and less expensive, too — a performance boost for your wallet.

**TABLE 2. Feature Comparisons**

Cache Tested	What can it cache?	Pros	Cons	Write-Delay Caching?	Windows tools, features?	Extras (Goodies)
<b>SmartDrive</b>	Floppy, hard drives only	Free, fast	No support for CD-ROM	ON by default, but optional	Cache stats, testing	Includes DOS 6.0 or Windows—your choice
<b>SpeedCache</b>	Floppy, hard drives, CD-ROMs (any DOS device), not networked drives	Can speed boot-up. Lends memory with Windows as needed	Makes some changes to Windows setup	ON by default, but optional	Cache stats, testing, setup, and flush	
<b>Lightning CD</b>	Floppy, hard drives, CD-ROMs (any DOS device), not networked drives	Shares memory as needed with applications, including Windows	Doesn't always detect compressed drives. Very little Windows support	ON by default, but optional	None	Screen, keyboard speed-up, screen blanker, tree delete, disk lights (DOS only)
<b>PC-Kwik PowerPak</b>	Floppy, hard drives, CD-ROMs (any DOS device), not networked drives	Can use all memory for cache, yet share it with some applications and Windows	Makes changes to Windows setup. Up to 60K low memory used	OFF by default, but supported	Cache statistics and flush	Text, keyboard, printing speedup, screen blanker, scrollbar, defrag, DOS editor, more (DOS only)
<b>CacheAll</b>	Floppy, hard drive. Special support for slow drives and CD-ROM network.	Swap files allow huge cache for slow drives. Speeds up networks. Can run with SmartDrive	Can't automatically handle compressed drives	No write caching, but runs with SmartDrive	Statistics, full-featured reconfiguration and flush	







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Product Information Number 142



# MIDI and Multimedia

## How to Get Started

David M. Rubin



*MIDI was born to serve the needs of musicians, but now it's something much bigger — and something any computer owner can use.*

It all happened more than a decade ago as the electronic music juggernaut swept through the entertainment industry. Musicians — in an effort to develop new musical timbres — began playing notes simultaneously on different synthesizers set for different sounds. This process — known as *layering* — produced musical passages that were richer and “fatter” than any single instrument could provide.

Unfortunately, there was no easy way to layer notes with these early synthesizers because they all used different methods for creating and triggering their sounds. You could play two keyboards together — one with each hand — but this had obvious limitations. In the studio it was common to overdub passages with different instruments, but this was cumbersome at best and of no value for live performance.

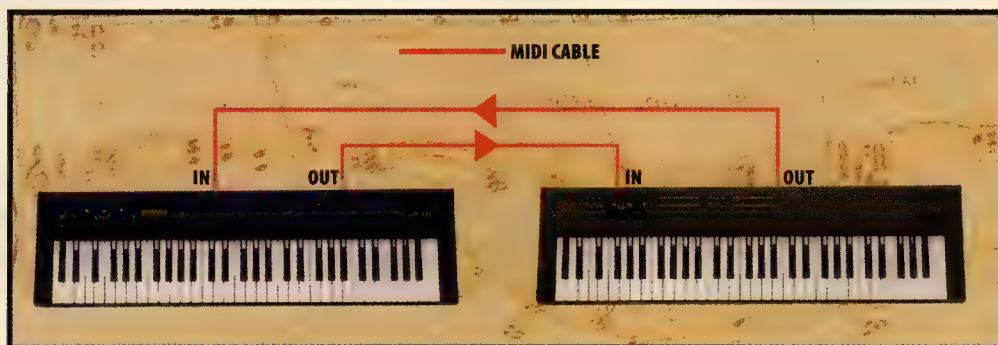
What musicians really needed was a simple way to connect different brands of synthesizers so that anyone could play two or more instruments from a single keyboard. In 1983 — in a rare show of cooperation — five major manufacturers of electronic instruments hammered out the MIDI 1.0 Specification and the world of music has never been the same.

The MIDI Specification establishes a set of standards that ensure proper hardware compatibility between different brands of electronic instruments. It also provides a standardized protocol for transmitting and receiving data between MIDI-compatible devices.

MIDI (Musical Instrument Digital Interface) is a serial interface that transmits at 31,250 bits per second. It uses specially designed serial cables with round five-pin DIN plugs at both ends. Because MIDI data can only travel in one direction on each cable, fully-implemented MIDI instruments always provide at least two connections (labeled In and Out). Most MIDI instruments also have a third connection labeled Thru that passes the incoming data along unchanged.



When two instruments are connected by a MIDI cable, you can play notes on one keyboard (the master) and have the corresponding notes respond on the other instrument (the slave). By attaching the Out port of one synthesizer to the In port of another, and vice versa, you can establish a bi-directional data flow (Figure 1). With this setup — assuming both instruments have keyboards — either one can be the master or the slave.



**Figure 1:** A simple bi-directional setup lets either instrument transmit or receive data.

### Getting the Message

It's important to keep in mind that MIDI cables do *not* carry audio signals. This is a common source of confusion. You cannot, for instance, make a Yamaha DX7 sound like a Roland D-50 by simply connecting the two devices with MIDI cables. Each instrument can only produce the sounds that it's capable of making on its own. What MIDI does is allow you to send performance data from one instrument to another via a series of messages that tells the receiving device what's happening at the source. There are several types of MIDI messages — here are some of the most common:

**Note on** — Every time you press a key on a MIDI keyboard a message is sent indicating that a note — and which particular note — has been played. MIDI has a range of 128 possible notes numbered from 0 to 127. Middle C on a piano corresponds to MIDI note number 60.

**Velocity** — The note-on message includes additional data that indicates how hard the note is struck. There are 128 possible velocity values.

**Note off** — The note-off message indicates that the key has been released.

**Aftertouch** — This is also called pressure data. It indicates how hard the key is pressed after reaching the end of the keystroke and before the key is released. Aftertouch is often used to add vibrato to sustained notes, but it can also change a sound in a variety of ways depending on how it's assigned.

**Pitch bend** — This message is usually triggered from a wheel or lever on a keyboard that lets you slide a pitch up or down to "scoop" or "bend" notes.

**Program change** — This message tells a synthesizer to change from one internal sound (also called a preset, patch, or voice) to another.

**System exclusive** — Because different brands and models of instruments have different internal parameters

for creating sounds, MIDI includes a special kind of message that is specific to each model of instrument. It lets you change internal settings and edit sounds.

### The Right Channel

With setups that include several MIDI instru-

ments, it's important to ensure that the performance data reaches only the intended devices. Otherwise you'll hear a cacophonous mess as all the instruments in the system try to respond to all of the incoming messages. To solve this problem, MIDI provides 16 channels for subdividing the data. Unlike audio signals that travel through individual cables, MIDI channels all flow through the same cable. The channel information is embedded in the MIDI data and each device responds only to the information that it's set to receive.

The most often used analogy is that of a cable television system, where numerous channels are carried simultaneously over a single cable. You determine which channel to watch by setting the tuner on the TV. If you have several television sets attached to the cable you can have each one receive a different channel. MIDI works in much the same way.

### MIDI Meets Its Match

MIDI may have begun life as a means of hooking together synthesizers, but it really began to shine when personal computers entered the scene. With the right software, musicians can compose, arrange, record, play back, edit, organize, and print their music. MIDI's capabilities have surpassed the expectations of even its most avid promoters. Computer-based MIDI systems can now control stage lighting, operate tape decks, configure mixing panels, synchronize music and sound effects to video, and much



more. As a mature and robust technology, MIDI is ideally suited to bring high-quality sound to multimedia.

### Interfaces and Sound Sources

Unless you have an Atari ST (which has built-in MIDI ports), the first thing you'll need for your MIDI system is a MIDI interface. Macintosh interfaces are external units that plug into the printer and/or modem ports and provide the necessary MIDI connections. A PC interface usually takes the form of an expansion card that attaches to an external box or set of adapter cables. If you don't have an available card slot, you can buy a small interface that plugs directly into a serial or parallel port. They're often used by people with laptops.

Sound cards that adhere to MPC specs also include an onboard MIDI interface, but the level of implementation varies from one brand to the next. Most of the time, a dedicated MIDI interface provides greater compatibility and better performance. In any case, the MIDI interface translates MIDI data into (and out of) a form the computer can understand.

To complete your basic computer/MIDI setup, you need something to generate the sounds. For a typical multimedia system, the options fall roughly into three categories: synthesizers, sound modules, and sound cards.

*Synthesizers* are simply keyboard devices that create sounds electronically. How the sounds are created varies from model to model. Yamaha's legendary DX series of keyboards, for instance, used FM (frequency modulation) synthesis. Until recently, Roland's most popular keyboards used L/A (linear/arithmetic) synthesis. Most of the newest synthesizers, however, use short digital recordings called samples as the basis for creating their sounds. Sample-based synthesizers generally do a better job of capturing the complex timbres that are associated with acoustic instruments.

A *sound module* is a synthesizer without a keyboard. It is essentially the sound-producing part of a synthesizer in a compact, stand-alone housing. Many synthesizers also come in a sound module version. For most multimedia presentations, sound modules are the best way to go. They're versatile, they take up very little desktop space, and they're easily transportable.

Also, they work with any computer. Some companies — Yamaha, Roland, and E-mu Systems among them — now offer sound modules with built-in MIDI interfaces. They bring plug-and-play simplicity to those seeking a basic, cost-effective, desktop MIDI system.

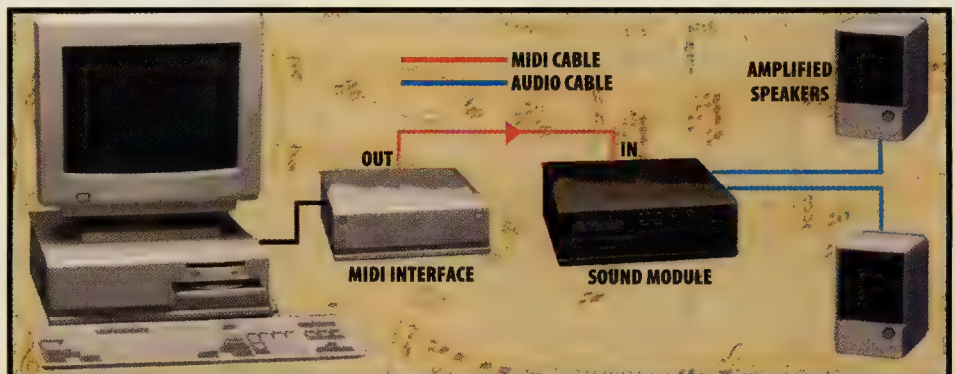
Thanks to Windows and its multimedia capabilities, *sound cards* have nearly become standard PC components. These add-on cards typically include a MIDI synthesizer chip for generating sound. Unfortunately, most of the currently installed cards use one of Yamaha's greatly scaled-down FM synthesis chips (OPL-2 and OPL-3). These inexpensive chips leave much to be desired both in their variety of timbres and in their quality of sound. But several new sound cards are arriving on the market with improved MIDI output quality, so the future looks bright for onboard multimedia PC sound.

Regardless of your system configuration, a MIDI sound source must have certain characteristics to be useful for multimedia. First it must be *multitimbral*, which means that it can produce several different instrument sounds at once (usually on different MIDI channels).

Second, a sound source must have adequate *polyphony*. This refers to the number of notes that an instrument can play simultaneously. For example, an eight-part multitimbral sound module with 16-note polyphony can play as many as 16 notes at once spread among eight different instrument sounds. A good multimedia configuration would combine 16-part multitimbral capability with at least 24-note polyphony.

### Setting Up

Since you don't need a keyboard to edit or play MIDI files, a basic playback-only setup is all that's required to add MIDI music to your desktop presentations. The simplest system includes three main components: the computer, a MIDI interface, and a sound module (Figure 2). Depending on



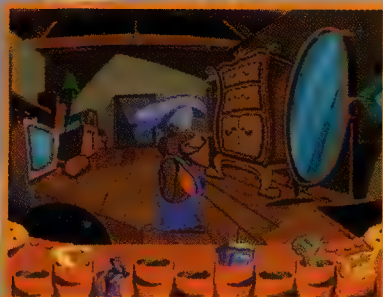
**Figure 2:** A simple playback-only system works fine for adding music to desktop presentations.



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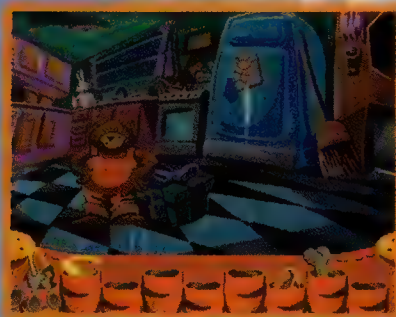
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your hardware configuration, some of these components may be combined with others and some may be internal rather than external, but the basic elements are the same.

This is an ideal entry-level system for non-musicians who want to work with MIDI files and multimedia. There are currently hundreds of MIDI files available on bulletin boards and other sources, and there are dozens of companies offering high-quality transcriptions of classical and popular music in MIDI file format. (Remember that copyright laws apply to MIDI music just as they do to other kinds of music.) Additionally, there are now several CD-ROMs that provide license-free, MIDI production music especially for multimedia. If you want to skip the composing stage of production and go directly to editing music, this system should work fine.

If, on the other hand, you also want to do some performing and composing, then simply replace the sound module with a synthesizer and add another MIDI cable (Figure 3).

For an even better solution, add a MIDI keyboard controller to the system (Figure 4). Keyboard controllers send out MIDI performance data, but they don't make any sounds themselves. They're usually better than the keyboards that come with synthesizers, and they add flexibility to your setup. If you have to transport your MIDI system to a school, trade show, or business meeting, you can leave the keyboard at home because it's only needed for composition, not for playback.

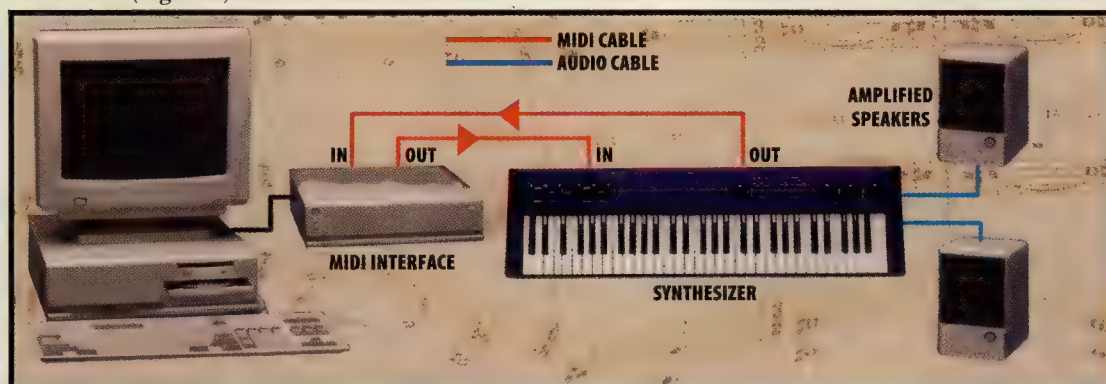
Complex, large-scale MIDI compositions often require more sound-producing capability than a single sound module can supply. Fortunately, it's easy to expand a MIDI system to provide additional instrument sounds and greater polyphony. By connecting the MIDI Thru port of one module to the In port of another, you can daisy-chain several instruments to create a MIDI network (Figure 5).

If you use a professional-level multi-port interface, you can connect each of the sound modules directly to the

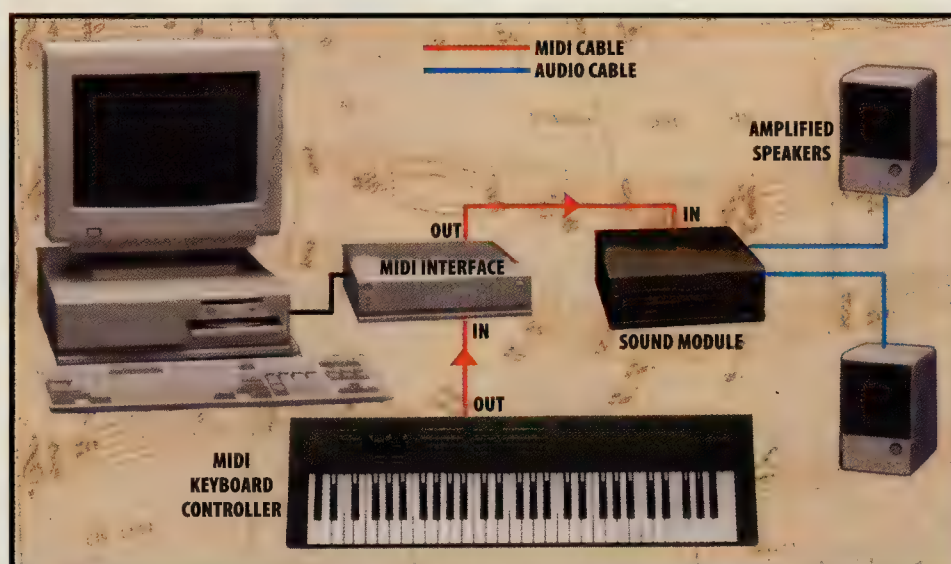
MIDI interface rather than to each other. This provides greater control over the data flow and creates a more versatile configuration.

In either case, the stereo output from each sound module goes to a mixer that combines the audio signals into a single stereo output.

MIDI instruments rarely include built-in speakers, so the final stage in playing back your MIDI music involves amplifying the line-level audio output from your sound module, sound card, or mixer and sending it to a speaker system. The best solution is to use self-powered, desktop speakers; these combine amplifiers and speakers into a compact system that integrates neatly with your computer. (For more information, see "Desktop Speakers:



**Figure 3:** This setup lets you record and play back MIDI performances with your computer.



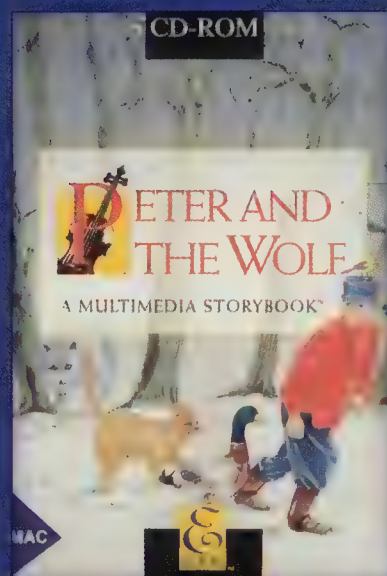
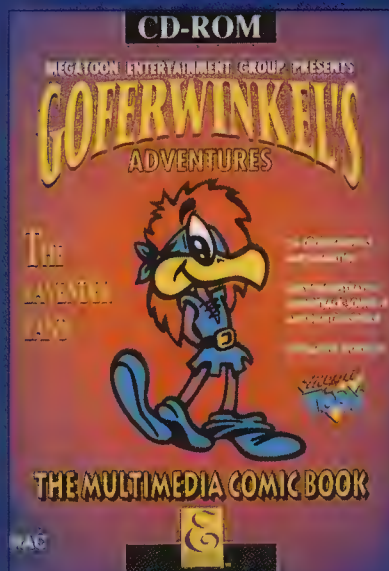
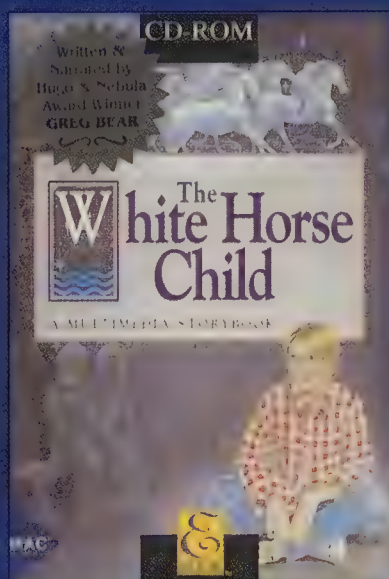
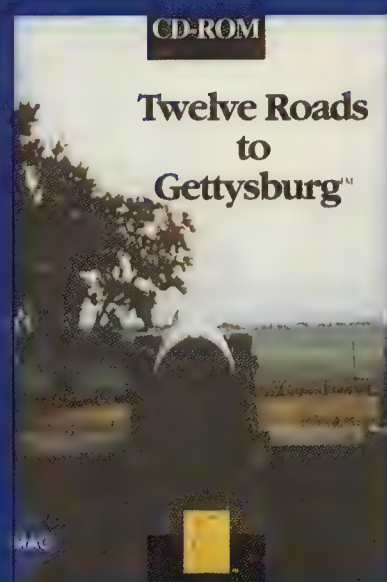
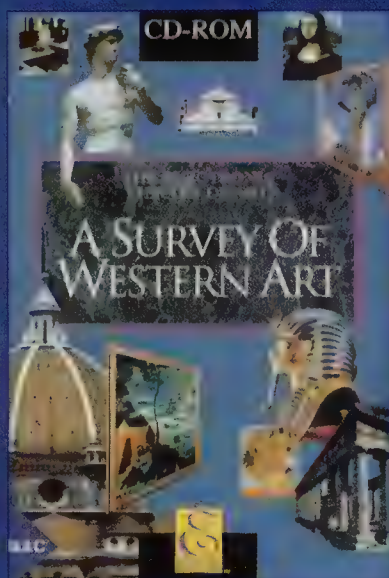
**Figure 4:** A keyboard controller improves your MIDI setup by adding flexibility to your system.



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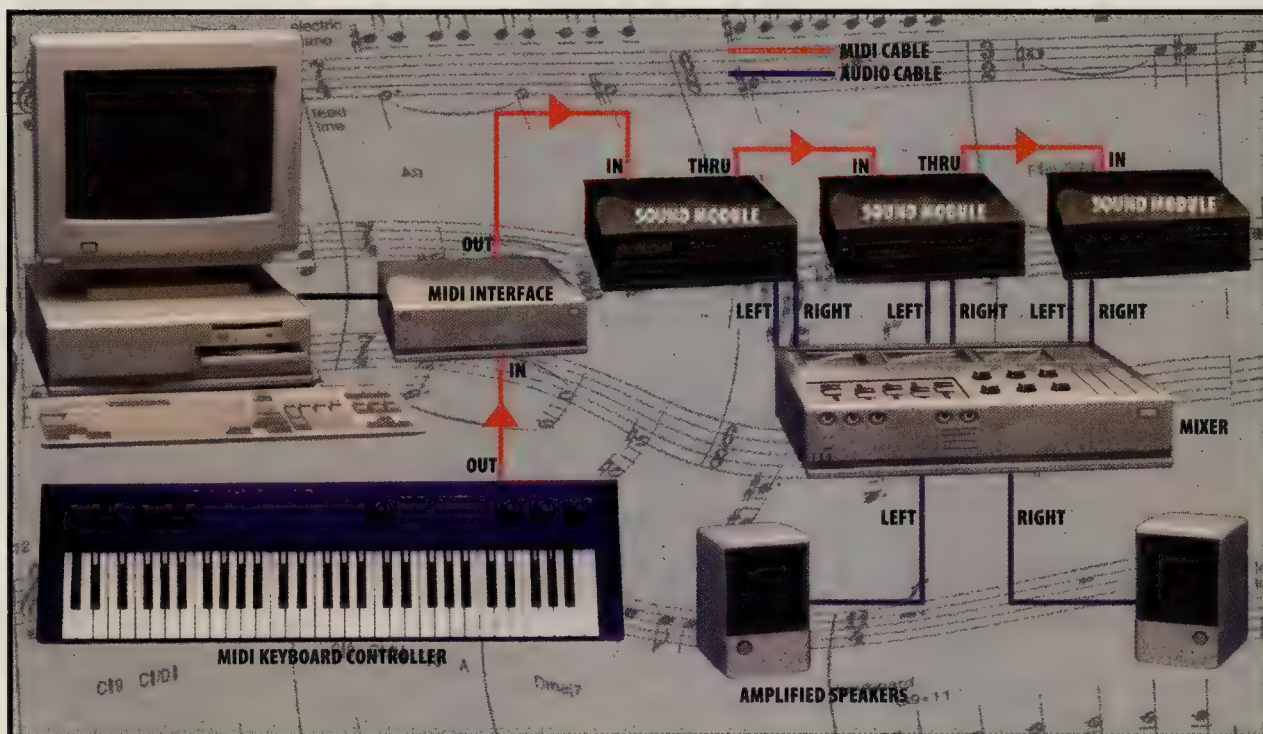
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**Figure 5:** It's easy to expand a MIDI system by using the Thru port on each sound module.

A Buyer's Guide," elsewhere in this issue.)

There are many kinds of software that allow you to work with MIDI data, but the most common type of program is a *sequencer*. Sequencers let you handle MIDI performance data the way word processors let you handle text. In fact, both types of programs share common functions such as Cut, Copy, and Paste.

When you play a MIDI keyboard, the performance data is sent to your computer where the sequencer — which functions much like a multi-track tape deck — stores the information and allows you to view it in a number of ways:

A **Graphic display** (also called a piano-roll display because of its appearance) shows MIDI notes as small rectangular bars on a grid.

An **Event List display** shows MIDI data in a vertically arranged chronological list.

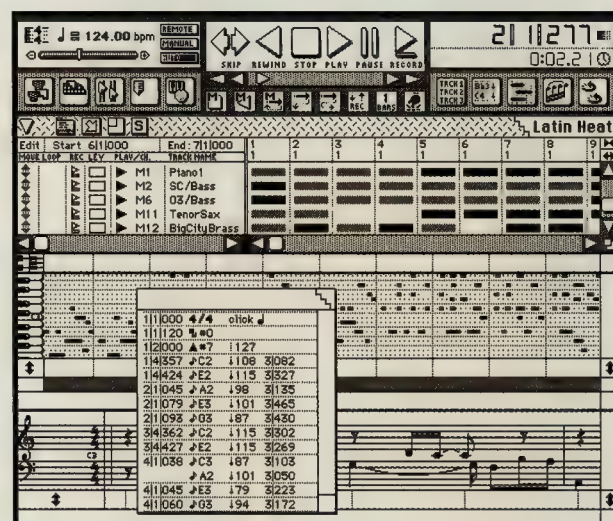
A **Notation display** shows your performance in standard musical notation.

A **Track Overview display** shows the presence of MIDI data in the different tracks of a MIDI composition.

Mid- to high-end sequencers always include at least two or three of these displays (Figure 6). Most also include an onscreen mixer with faders that let you adjust the individual instrument sounds in your MIDI arrangement.

Multimedia producers have much to gain from the important benefits that MIDI provides. Because MIDI

sound output comes directly from the sound source — in real time — there's no degradation of audio quality from digitizing or recording on tape. And MIDI files take up a



**Figure 6:** High-end sequencers let you view MIDI data in a number of ways.

small fraction of the storage space that digital audio files demand. Best of all, musicians and non-musicians alike can edit and re-orchestrate MIDI music to fit their needs. With the growing number of multimedia applications that support the playback of MIDI music, it's time to put this powerful resource to work for you.



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# Multimedia: The Salvation of Apple?

Steven Anzovin

It's been a tough year for Apple—but its latest hardware and software efforts have raised plenty of eyebrows in the multimedia arena.

**T**he hottest buzz at the summer MacWorld Expo in Boston is always about the latest technology from Apple. But this year, Apple news and Apple products did more than just attract attention—they completely dominated the show. Recent losses, price cuts, layoffs, reorganizations, and reams of bad press did not tempt Apple to keep a low profile. Instead, the company unleashed a host of innovative, attractively priced multimedia hardware and software that raises the technology bar to a new height.

## Audio Visual Macs

The Newton MessagePad,

Apple's handheld personal digital assistant, grabbed most of the limelight at MacWorld. However, some of Apple's most radical new technology was to be found in three new multimedia Macintoshes, all with Apple's high-speed internal CD-ROM drives as standard equipment.

The high-end Quadra 840AV and the mid-range Centris 660AV incorporate audio-visual features never before found in stock personal computers, and at a price point lower than that of beefed-up MPC machines with similar capabilities. Both machines offer S-video and CD-quality 16-bit stereo audio recording and output. Voice-recognition and voice-synthesis software allow these Macs to take commands by voice and to talk

back with an understandable accent, opening the way for voice interaction with CD-ROM applications and games. A digital signal processing (DSP) chip handles all the heavy processing required, plus advanced telephony functions as well.

Finally, these screaming Macs boast a faster bus, direct access to memory by plug-in cards, built-in Ethernet, and a speedier interface for CD-ROMs, hard drives, and other external devices. With their promised PowerPC upgrades (the PowerPC is an advanced RISC-based microprocessor developed by Apple, IBM, and Motorola; it's slated for shipment in spring 1994), the AV Macs promise to blow the tires off a Pentium-based PC.

## CD-ROM Macs for Schools

More interesting to educators at the show was the Macintosh LC 520, a multimedia Mac designed specifically for classroom use. This one-piece unit incorporates all the innards of a Mac LC III, currently Apple's most popular computer, along with a high-quality Sony monitor, 16-bit color video, 8-bit sound, built-in speakers, a microphone, and an internal Apple CD-ROM drive. The LC 520's all-in-one design means that the monitor, CD-ROM



**At the high-end of the new Mac multimedia systems is the Quadra 840AV, priced at \$4069-\$6249, depending on configuration.**

drive, cables, and other parts can't just disappear, as often happens in a classroom environment. This Mac is also extremely easy to service, another boon to computer labs: all the audio and video



controls are on the front panel, and the internal parts slide out



*Depending on which options you want bundled, the Centris 660AV will cost between \$2139-\$3449.*

through detachable front and rear bezels, with no cables to unplug. All of this comes for just over \$1500, significantly less than an MPC of similar capabilities. Although this well-designed multimedia machine is available only to schools, expect to see a Performa version sometime next year.

### A CD-ROM in Every Box

According to Steve Franzese, head of Apple Worldwide Multimedia Marketing, Apple's master plan is to be a major player in the emerging interactive multimedia services industry. Key to that goal, says Satjiv S. Chahil, Apple's VP of New Media/New Markets, is CD-ROM: "CD-ROM, we believe, is the bridge to the new multimedia world. So we want everyone to have a CD-ROM in his or her Macintosh." Apple is already offering a CD-ROM option for every new

Mac desktop model, and plans to make plug-and-play CD-

ROM upgrade kits available for most other Macs as well.

The AppleCD 300-series drive (\$493) and the new portable PowerCD (\$499) are among the fastest currently

available. These CD-ROM players are all double-speed, multi-session PhotoCD-compatible, and audio CD-capable — plus, a built-in Apple CD-ROM drive costs hundreds of dollars less than the competition. That's why most CD-ROMs attached to Macs have an Apple logo on them. By year's end, Apple hopes to sell a million CD-ROM drives, making the Cupertino company the world's largest seller of CD-ROM hardware. To do that, however, Apple will have to reach beyond the Mac market. So expect to see Apple-labeled CD-ROM bundles for MPC on dealers' shelves soon.

### QuickTime and ScriptX

Apple is not content merely to hawk hardware. Software has always been the company's real strength. And here again Apple is moving into PC territory. QuickTime, Apple's multime-

dia operating-system extension, has been available in a Windows version for several months. While technically superior to Microsoft's Video for Windows, QuickTime is having a tough time gaining acceptance against the Microsoft juggernaut. And it didn't help matters when four key engineers from the QuickTime development group announced their intentions to leave the company in August to join Rocket Science Games, an entertainment start-up company.


Apple is likely to have more success with ScriptX, the cross-platform multimedia authoring language under development at Kaleida Labs, a joint venture of Apple and IBM. At a technology demonstration of ScriptX, Kaleida's co-chairman Nat Goldhaber swapped a self-contained ScriptX multimedia program on CD-ROM back and forth from a Mac to a Windows-based PC: the disc and software worked identically on either machine.

If ScriptX becomes a standard, as Apple hopes it will, then a single ScriptX-based CD-ROM title will run on any CD-ROM player, whether it's attached to a Mac, a PC, or a video-game box. This will save developers the expense of developing multiple versions for different platforms, clear space on dealers' shelves, and drive down disc prices for consumers.

Moreover, the alpha version of ScriptX I saw provided amazingly smooth real-time 3-D movement and interactivity — all without custom graphics chips. Kaleida thinks it can do entirely in software what 3DO's upcoming CD-ROM player will do in hardware.

ScriptX is expected to ship early in 1994.

Since the

Mac first appeared in 1984, Apple has billed itself as the technology leader in personal computing. Six months ago, that title had a hollow ring. Apple products were slower and more expensive than their PC counterparts, its product line and corporate organization were confusingly unfocused, and the company was lavishing resources on projects that had no sure payoff. But Apple has now recaptured the technology lead in multimedia and is making a strong bid to play a leading role in the future of CD-ROM. 



*The LC 520, targeted to classroom use, has a lot to offer for the price (\$1509). A Performa version of this machine is slated for the mass consumer market sometime next year.*



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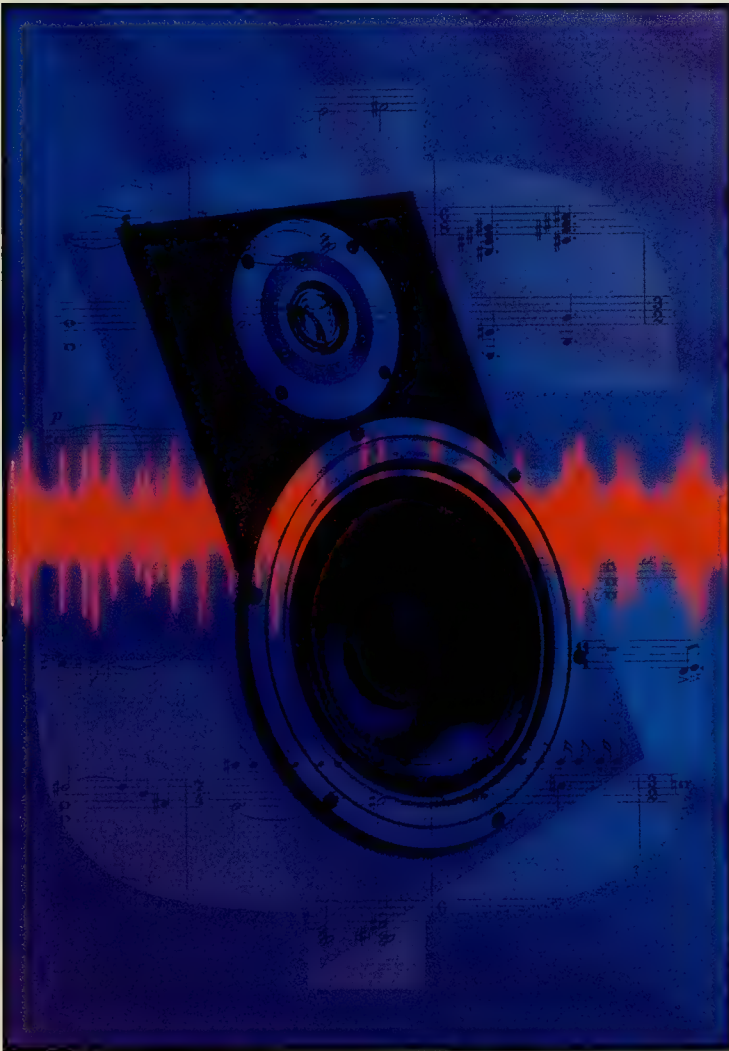
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# Desktop Speaker Systems: A Buyer's Guide

David M. Rubin



*Here's the rundown on 34 popular speaker systems designed for use with your multimedia computer, along with some helpful hints about what to look for and what to avoid.*

There was a time when a single, built-in, half-dollar-size speaker was considered state-of-the-art in computer design. By today's standards, RAM requirements were lilliputian, hard drives were optional, monitors were strictly monochrome, and CD-ROMs had not yet left the drawing board. But times have changed...or have they?

Although the rest of computer technology has raced ahead to fulfill its multimedia destiny, the lowly internal computer speaker is still back at the starting gate — small, underpowered, cheaply made, and badly positioned.

Many developers invest huge amounts of time and energy producing multimedia titles with dazzling graphics and animation only to have their efforts undermined by an audio track that sounds like it's coming through a telephone.

It's important to keep in mind that sound production and playback involve several stages and the final output quality can only be as good as the weakest link in the chain. With the rapidly growing popularity of 16-bit sound cards, MIDI sound modules, and CD-ROM drives, the weakest audio link for many people is the final link — the speaker system. Even 8-bit audio can benefit enormously from playback through better speakers. So if your multimedia soundtracks seem to be missing something, it may be time to shop for some new speakers.

## Specialized Speakers

To make a large-scale presentation in a lecture hall or auditorium, you'll need a powerful amplifier and loud-speaker system. But desktop multimedia is aimed primarily at individuals or small groups. Of course, you can use your home stereo system to amplify and play back your computer's audio output. But, for most people, this is not a practical solution. Fortunately, the growth of multimedia-based computers has spawned a burgeoning market for



speaker systems specifically designed for the desktop environment.

These speakers come in a wide variety of shapes and sizes, but they all share three important characteristics.

First, desktop speakers must be magnetically shielded to prevent distortion of the images and colors on screen. In most cases, you'll want to place the speakers right next to your monitor to produce the proper stereo image for close-range listening. Magnetic shielding makes this possible and also reduces the risk of data loss to nearby floppies (although you still shouldn't place a disk directly on any speaker).

Second, desktop speakers include built-in amplifiers to boost the line-level output from sound cards, MIDI sound modules, and CD-ROM drives. Integrating the amplifier with the speaker helps reduce desktop clutter and makes setup and operation easy.

Finally, these speakers are compact in size. They conserve valuable desktop real estate, and they're easily transportable, making them ideal for trade shows, classrooms, or anywhere away from the office.

### Searching for Quality

Aside from obvious cosmetic differences, speakers vary considerably in their internal designs. The individual sound-producing components in each speaker enclosure are called *drivers*. The simplest speaker design employs a single driver to reproduce the entire sound spectrum. Other designs use specialized drivers optimized to reproduce specific frequency ranges.

A *two-way* system uses a driver called a *tweeter* for the high frequencies and a separate driver called a *woofer* for the low frequencies. *Three-way* speakers add another driver between these two called a *mid-range*. In theory, using specialized drivers to divide up the frequency range should produce better results, but speaker design and quality vary so much from one manufacturer to the next that driver configuration alone is not a reliable gauge of sound quality.

Because desktop speakers are small they normally have difficulty reproducing very low frequencies. To overcome this limitation some manufacturers offer systems that include (in addition to the stereo speakers) a third speaker called a *subwoofer*. The subwoofer — optimized for frequencies below about 100Hz — can sit on the floor beneath the desk to provide the low frequencies lacking from the stereo "satellite" speakers above.

The integrated amplifiers in desktop speaker systems are designed to handle the line-level signals coming from sound cards, MIDI modules, and other similar hardware. But the amount of power that the amplifiers deliver to the drivers varies considerably from one model to the next.

The speakers mentioned in this article have power output ratings that range from only a few watts to more than 30 watts per channel. In general, the more power in a speaker system, the greater the volume it can produce without distortion. But since speaker construction and driver efficiency vary quite a bit from product to product, output power is best viewed as an approximate guide to potential volume.

*Frequency response* — the range of frequencies that a speaker can reproduce — is another possible source of confusion. Although people hear frequencies ranging from 20Hz to approximately 20kHz, small speaker systems seldom match that range entirely. Most people will not mind a somewhat narrower frequency response if distortion is kept low. But with too little bass, music sounds thin, and with too little high end, music and speech lacks clarity.

As a general guide, the wider the frequency response the better. But because two different speakers can have the same frequency response and yet sound totally different (and produce different amounts of distortion as well), it's best to consider frequency response as a general rather than a definitive indicator of sound quality.

Printed specs often tell you more than you want to know about some things and much less than you need to know about others. So the best advice is to listen to speakers before you buy. But don't forget other important considerations like the number of inputs and the type and number of front-panel controls. Depending on your specific needs, these might weigh heavily in favor of one model over another.

### What's Out There

The following is a guide with brief descriptions of 34 desktop speaker systems from more than a dozen companies, listed alphabetically. With such a wide range of sizes, shapes, designs, and price tags available, you should be able to find just what you need for your multimedia system.

Note: the output power of these speakers is always given in watts per channel and the prices (suggested retail per set) are rounded to the nearest dollar. All specs were supplied by the manufacturers themselves.



### Acoustic Research

This company has a well-established reputation for designing high-quality stereo speakers and the **Powered Partner 570** (\$400) carries on that tradition. Each of the wedge-shaped, aluminum-alloy enclosures houses a two-way, acoustic suspension system with a 1-inch tweeter and a 5-inch



**Powered  
Partner  
570**

woofer. The 35-watt AC/DC amplifier in each speaker is considerably more powerful than that found in most other products included in this article, and the impressive 40Hz-25kHz frequency response explains why these speakers have gained such popularity for trade-show demonstrations and multimedia exhibits. Each speaker includes a single RCA-type input jack, as well as treble, bass, and volume controls.

For less critical, close-range listening AR also offers the **Powered Partner 22** (\$110). This compact system uses a single 2.5-inch driver and a 3-watt, AC/DC amplifier in each speaker.

If you want a step up in sound quality (with better bass response) you might consider the **Powered Partner 622** (\$350), a three-piece system with two small satellite speakers and a separately powered subwoofer. The satellites each include a 2.5-inch driver and an 8-watt amplifier; the subwoofer houses a 6-inch driver with a 30-watt amplifier. Volume and tone controls for the system are mounted on the subwoofer enclosure and the system produces a very respectable 50Hz-20kHz frequency response.

### Altec Lansing

Traditionally known for its high-end speakers for audiophiles, Altec Lansing is in the multimedia arena with a variety of products. The **ACS300** (\$400) is a uniquely designed three-piece system with two satellite speakers and a subwoofer. Each of the satellites includes a 4-inch woofer, a 0.5-inch dome tweeter, and an 18-watt amplifier. The subwoofer has its own 18-watt amplifier in a *tuned-port* enclosure with two 4-inch drivers.

The ACS300 satellites employ a distinctive hinged clamshell design that lets you position the drivers for optimum clarity when sitting on a table and makes it possible to mount the speakers in a variety of ways including on the sides of a monitor or flat against a wall.

The satellites provide two sets of audio inputs and, surprisingly, six different controls divided between the units. These include: master volume, mix, treble, bass, balance, and DSP. The DSP control simulates an expandable stereo soundfield from a monaural source to enhance sound quality at close range.

With its unique design, versatile controls, and published 35Hz-20kHz frequency response, the ACS300 system is worth consideration. For less demanding applications you can buy the same system without the subwoofer as the **ACS200** (\$300). And for the budget-minded, Altec Lansing offers the **ACS100** (\$180) — a scaled-down, less powerful version of the ACS200.

Altec Lansing has recently added the **ACS-50** (\$100) system, a new member to its desktop speaker line. The **ACS-50** consists of two compact (single-piece, non-hinged)



**ACS300**

speakers and a specially matched amplifier module that delivers 4.5 watts per channel. The two-way speakers each incorporate a 2.5 x 1.25-inch, oval-shaped, mid/bass driver and a .75-inch dome tweeter. The small speakers are designed to mount directly to a monitor for high-quality, close-range listening. The amplifier — which is also designed to mount on a monitor — provides a headphone jack, volume control, bass and treble boost circuitry, and inputs for two (mixable) audio sources. With its 100Hz-20kHz frequency response and its zero-footprint design, the ACS-50 is a good candidate for office cubicles or small spaces.



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Product Information Number 154



## Apple

As part of its commitment to multimedia, Apple Computer has recently released the **AppleDesign Powered Speakers** (\$180) — the first speaker system designed by a computer company expressly for desktop multimedia. Although these speakers are marketed by Apple, they work equally well with sound-equipped PCs. The single-driver (3.25-inch), tuned-port speakers incorporate active equalization and noise



*AppleDesign Powered Speakers*

reduction circuitry. One speaker provides a master volume control, a balance control, and two inputs.

## Bose

The **Video RoomMate** system (\$330) uses a single 4.5-inch, full-range driver for each speaker. One enclosure provides a master volume control and one stereo input. The built-in amplifier includes active equalization circuitry.

## Koss

Koss has recently begun offering several multimedia accessories, including three inexpensive speaker systems for desktop use. The single-input **HD/6** (\$100) features a 4-inch driver and a 2.5-watt, AC/DC amplifier in each enclosure. Both speakers also supply volume controls and bass-boost switches. Additionally, the HD/6 incorporates a unique "sleep mode" that draws less current when no audio material is present.

The **HD/4** (\$60) uses a 3.5-inch driver in its single-input, 3.6-watt-per-channel, AC/DC system. One speaker provides a master-volume control and a three-band equalizer for both channels.

The **HD/1** (\$40) is a low-cost, single-input alternative for games and non-critical applications. It delivers

3.6 watts through each speaker's 3-inch driver, and includes a volume and bass boost switch on each enclosure. The HD/1 will run on batteries or AC power.

## Labtec

Labtec's product line includes several inexpensive speakers for desktop use. Its low-end model, the **CS-150** (\$40), combines a three-inch driver with a 3-watt AC/DC amplifier, a bass/treble boost switch, and a volume control for each channel. The larger **CS-550** (\$60) provides slightly better bass response from its 3-inch drivers and 3.5-watt, AC/DC amplifiers. The similar **SS-700** (\$65) adds a 3-band equalizer to each speaker. For another step up in sound quality there's the **CS-800** (\$70) with 3.5-inch drivers, 2.5 watts per channel, and bass and treble switches.

If you need better sound and more power, Labtec offers its new **CS-900** (\$130). Each two-way speaker includes a 2-inch tweeter, 4-inch woofer, and a 7-watt AC-powered amplifier with bass/treble controls.

For limited-space applications, you might consider Labtec's **CS-1000** (\$150) which combines both stereo channels into a single unit that sits beneath the computer monitor. The CS-1000's front panel houses two 3-



*CS-1000*

inch drivers for high/mid-range frequencies and a single downward-firing 5.5-inch woofer that projects the low frequencies from beneath the case. The rear panel provides two sets of RCA-type jacks while the front panel provides a headphone jack, master volume, and tone controls for the 2.5-watt-per-channel, AC-powered amplifier.





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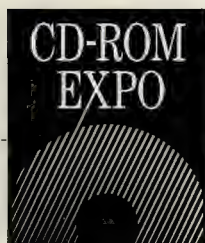
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### **MICS Computers**

The MediaMatch Powered Speaker System (\$150) from MICS includes an adjustable bracket that lets you easily mount the speakers on monitors ranging from 12-21 inches. Each speaker features a single 3.25-inch full-range driver combined with a 10-watt-per-channel amplifier and active equalization circuitry for improved sound quality. The MediaMatch system provides two stereo input jacks, a headphone jack, and an auxiliary output jack, along with mix, volume, and tone controls.

### **MIDI Land**

MIDI Land markets an extensive line of multimedia-related products including sound cards, microphones, and headphones. Several of its speaker systems are well-suited to desktop use. The AT-75 (\$160) — MIDI Land's top-of-the-line model — uses single-input, two-way speakers, each with a 4-inch woofer and 15-watt output. One enclosure provides bass, treble, and volume controls for both speakers.

For considerably less money you can get the PP-12MS (\$100) with a single 3-inch driver and a 5.5-watt amplifier for each side. One speaker provides the bass, treble, and volume controls for the pair.

For the budget minded, MIDI Land offers the CP-28 (\$40) — a small, single-driver, single input, 3.5-watt-per-channel, AC/DC system with a 3-band equalizer and volume control on each speaker. An auto shut-off feature preserves battery life.

### **Monster Cable**

The Persona PC and the identical MacSpeaker (\$230) combine good sound quality and several useful features in a system that delivers 10 watts per channel. Each three-way "high resolution" speaker — with a 75Hz-18kHz frequency response — houses a 3-inch woofer, 2-inch midrange, and ribbon tweeter.

The lightweight, 9-inch tall speakers take up little desktop space, but for even better close-range placement with zero footprint, you can mount them directly on the sides of your monitor.

The left speaker provides a single input jack, a headphone jack, volume and bass controls, and a "sonic imaging" control which can create a stereo image from a monaural source. The control lets you adjust the amount of stereo separation from close-in for one or two people to wide-field for small groups.

For improved bass response, Monster Cable also offers a subwoofer system that extends low frequencies down to



**MacSpeaker and Persona PC**

40Hz and includes its own 25-watt amplifier.

If you're on a tighter budget, you might consider the Persona Micro system (\$80). Each of its compact speakers uses a single 3-inch driver that runs on AC or DC power. The speakers provide a volume control and a separate bass and treble boost switch for each channel. You can mount the speakers on the sides of your monitor — for optimum close-range listening — or, with a unique interlocking system, you can hook the speakers together into a single stereo unit that can sit nicely on top of most monitors.

### **Roland**

Roland is best known for its extensive line of high-quality MIDI synthesizers, sound modules, drum machines, and sound cards. During the past few years, Roland has become quite serious about the multimedia market. As part of its Desktop Music System offerings, Roland is marketing a variety of compact speaker systems.

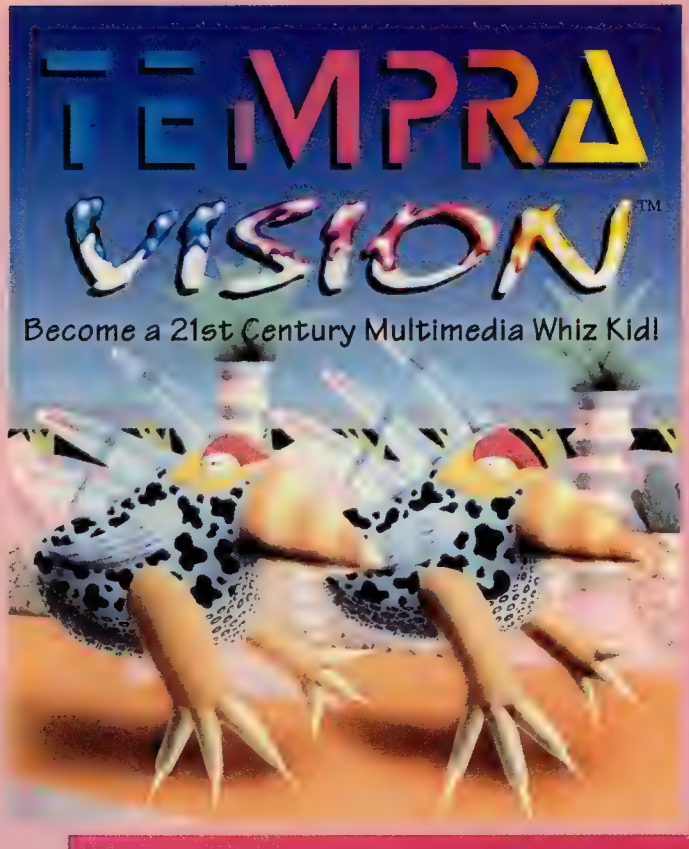
In both appearance and design, Roland's CS-30 (\$170) resembles Labtec's CS-1000. It's a single-unit, under-monitor, stereo system with two small forward facing drivers (for middle to high



**MA-7**



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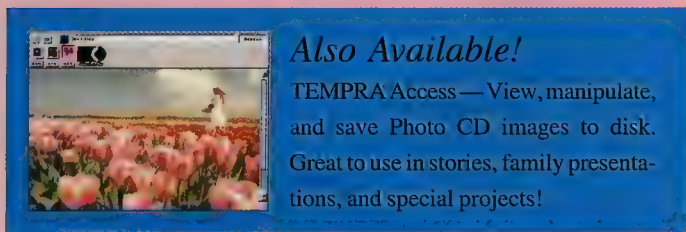
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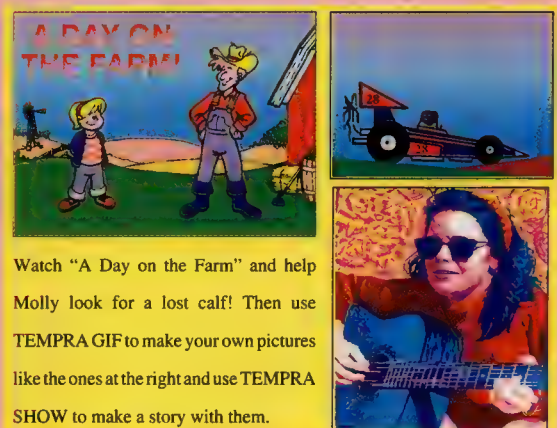


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frequencies) and a single downward-facing woofer. The built-in amplifier supplies 3.5 watts per channel, and the rear panel provides two sets of stereo inputs. On the front there's a volume control for each stereo input, a single tone control, and a headphone jack.

Although the CS-30 will improve the sound quality of any computer, Roland offers several other models that do much better at reproducing high-quality sound. The MA-20 (\$320) — with its separate speakers — costs more than the CS-30, but delivers 15 watts per channel and much better sound quality through its two-way, coaxial, bass-reflex design with 5-inch woofers. The rear panels provide separate microphone, instrument, and line-level inputs, each with a dedicated volume control. This lets you use any combination of inputs and mix the sounds through the amplifier. A single tone control affects the overall EQ.

For a less-expensive, but equally versatile alternative, you might consider Roland's MA-7 (\$230). It delivers 7 watts per channel from tall speakers with 3 x 5-inch, oval-shaped drivers. The MA-7 provides the same inputs and front-panel controls as the MA-20, only the MA-7 has them mounted on a single enclosure.

Roland's popular MA-12C (\$290) — the predecessor to the MA-20 — is also still available. Each speaker employs a single 4-inch full-range driver, a 10-watt amplifier, and the same three inputs as the MA-20. The front panel includes master volume, bass, and treble controls. The MA-12C's rubberized plastic housings, metal-screen grills, and heavy-duty power cords make it one of the most roadworthy systems around.

### Sony

As part of Sony's commitment to providing multimedia accessories, it offers two speaker systems that work well for desktop audio. The SRS-58PC (\$130) uses speakers with single 2.6-inch drivers and AC/DC amplifiers that deliver 3 watts per channel. The single-stereo-input system provides a volume control and power switch for each channel, as well as a switch that activates the "variable dynamic equalizer" tone control. The SRS-58PC also provides a handy amp/direct input switch that lets you bypass the internal amplifier.

In addition to most of the features found on the SRS-58PC, the SRS-88PC (\$200) adds more power with its AC-only, 10-watt amplifiers. The higher quality 2.6-inch drivers also provide improved bass response,



SRS-58PC

yielding a total frequency response of 70Hz-20kHz.

### Sound Minds Technology

Twin Sound (\$90) is a unique product that lets you improve the audio quality of your PC without taking up any space and without adding more cables across the desktop. It consists of a magnetically shielded, single-unit stereo system that mounts directly into any unused 5.25-inch disk bay. Behind its front panel there are two 1.6-inch drivers and a



Twin Sound

2-watt-per-channel amplifier. The manufacturer claims that the levels of magnetic leakage are so low that it's safe to mount the Twin Sound unit next to any other disk drives.

The Twin Sound front panel provides separate volume controls for the left and right channels and a switch that lets you route either the PC's speaker signal or your sound card's output to the Twin Sound speakers. There is also an amplifier-bypass switch, a microphone input jack, and a headphone jack.



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Although the Twin Sound system cannot do justice to music playback, it will nonetheless improve a PC's sound quality for close-up, non-critical listening. And it adds functionality and convenience besides.

### Yamaha

Yamaha first entered the computer-music, desktop-speaker market with its CBX-S3 (\$300). Each of the speakers in this system houses a single 4-inch driver — ported for extra bass — and a 10-watt amplifier. The CBX-S3 provides microphone and line-level inputs along with volume and tone controls and delivers a frequency response of 70 Hz-20kHz.



YST-M10

Yamaha's newest speaker system, however, may soon overshadow the CBX-S3 with an improved price/performance ratio. The YST-M10 (\$150) produces 10 watts per channel through its 3.5-inch drivers that provide a frequency response of 80Hz-20kHz. The single-input system includes master controls on one speaker for volume and "presence" and also comes with cables and several adapters. The YST-M10 incorporates several unique design elements, including spruce wood cones for the drivers and a rather pregnant-looking shape for the enclosure.

## Technical Terms and Tips

**Driver:** The individual hardware component (tweeter, woofer, midrange) that generates sound from a speaker. Although high-end systems typically use two or more drivers in each speaker, the presence of separate drivers *per se* is not a guarantee of superior sound quality. In fact, some of the best-sounding desktop speakers use single, full-range drivers.

**Efficiency:** The ease with which a driver responds to an amplifier's signal. An efficient driver requires less power to produce a given volume than an inefficient driver. This has nothing to do with sound quality, but it's important to keep in mind. Because some drivers need less power than others, the rated output of a speaker's amplifier does not tell the whole story about that speaker's potential loudness.

**Frequency response:** The range of frequencies that a speaker can reproduce within a set of specified tolerances. Even though two brands of speakers might cover the same audio range, they'll usually emphasize or de-emphasize different frequencies within that range. This is why speakers with the same frequency response can still sound dramatically different from one another.

**Hz:** The abbreviation for hertz — the standard unit of measurement for frequency. One hertz equals one cycle per second.

**Tuned port:** An opening or vent in a speaker enclosure that is designed to reinforce certain bass frequencies.

**Watts:** A measurement of power. When comparing speakers, be sure that the printed specs indicate watts per channel rather than total power.

### Desktop Speaker Companies

**Acoustic Research** 330 Turnpike St., Canton, MA 02021 (800) 969-2748

**Altec Lansing** Routes 6 and 209, PO Box 277, Milford, PA 18337 (717) 296-4434

**Apple Computer** 10431 North De Anza Blvd., MS: 38PR, Cupertino, CA 95014 (408) 974-4522

**Bose** The Mountain, Framingham, MA 01701-9168 (800) 444-2673

**Koss** 4129 North Port Washington Ave., Milwaukee, WI 53212 (414) 964-5000

**Labtec** 11010 N.E. 37th Circle, Unit 110, Vancouver, WA 98682 (206) 896-2000

**MICS Computers** 23505 Crenshaw Blvd., #201, Torrance, CA 90505 (310) 325-4520

**MIDI Land** 398 Lemon Creek Dr., Suite L, Walnut, CA 91789 (714) 595-0708

**Monster Cable** 274 Wattis Way, So. San Francisco, CA 94080-6761 (415) 871-6000

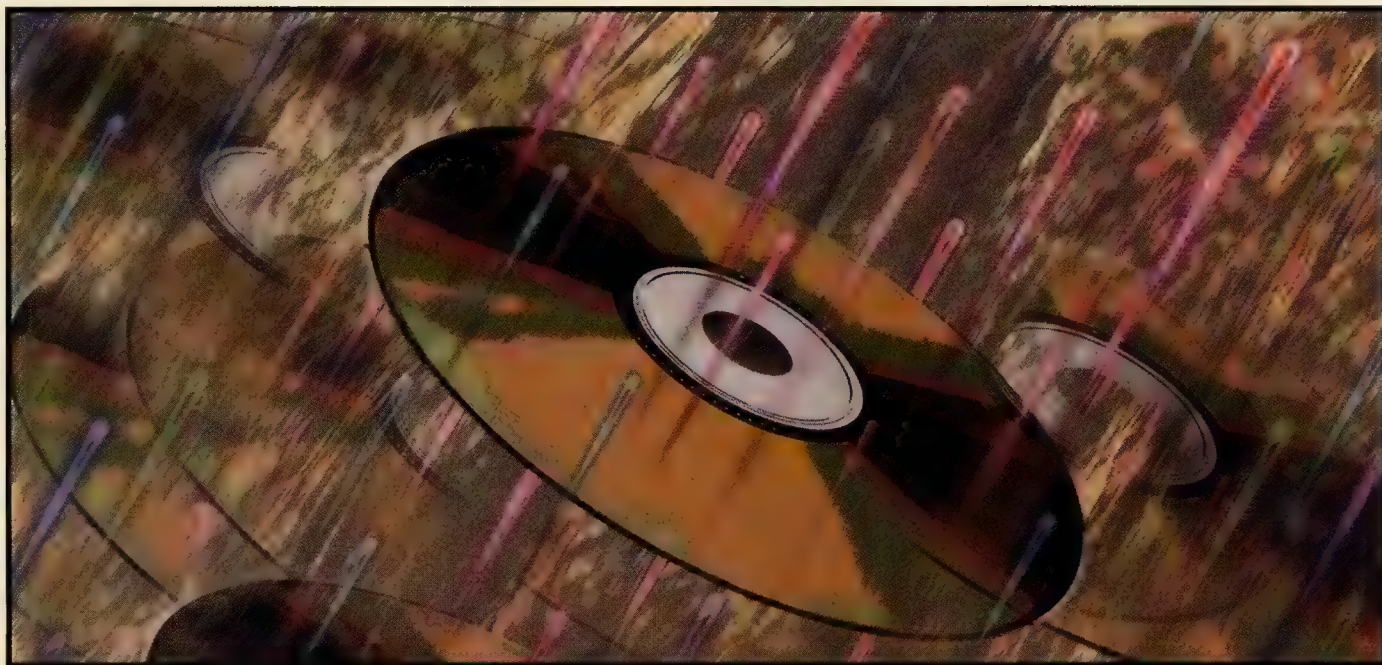
**Roland** 7200 Dominion Circle, Los Angeles, CA 90040 (213) 685-5141

**Sony** 1 Sony Drive Park Ridge, NJ 07656-8003 (201) 930-7664

**Sound Minds Technology** 1600 Dell Ave., Suite S Campbell, CA 95008 (408) 374-7070

**Yamaha** PO Box 6600, Buena Park, CA 90622 (714) 522-9240





# The Evolving World of CD-ROM Formats

If you've looked at ads for CD-ROM drives in the last six months, you've probably noticed a new batch of buzzwords, terms like *multi-session* and *CD-ROM/XA*. These are new CD-ROM formats that promise better interactive performance, enhanced audio, and new applications like Kodak's Photo CDs. But many existing CD-ROM drives can't read the new formats, so there's a new dose of uncertainty in the CD-ROM market, just as software publishers — and buyers — are beginning to feel comfortable with the existing CD-ROM market.

CD-ROM/XA (XA is for eXtended Architecture) builds on the existing architecture of the CD-ROM format. Any CD or CD-ROM is organized by *tracks* (a track is the equivalent of a song on an

*CD-ROM/  
XA and  
Multi-  
Session:  
Bound to Be  
the Very  
Next Phase*

— Tim Victor —

audio CD). Each CD-ROM track has a *mode*, which describes the type of data it contains. Mode 0 tracks hold conventional CD audio, while computer data resides in separate Mode 1 tracks. The XA standard redefines Mode 2, originally a seldom-used designation for "user data," to allow a mix of data types in a single track. Each data block, or *sector*, in a Mode 2 track includes a subheader describing the form of its data — Form 1 is for computer data and Form 2 is for audio.

Drives supporting XA audio are still rare, but they offer several advantages for interactive CD-ROM programs. XA audio, compressed with Adaptive Delta Pulse Code Modulation (ADPCM) encoding, affords two different sampling rates to



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## TECHNOLOGY / THE EVOLVING WORLD OF CD-ROM FORMATS

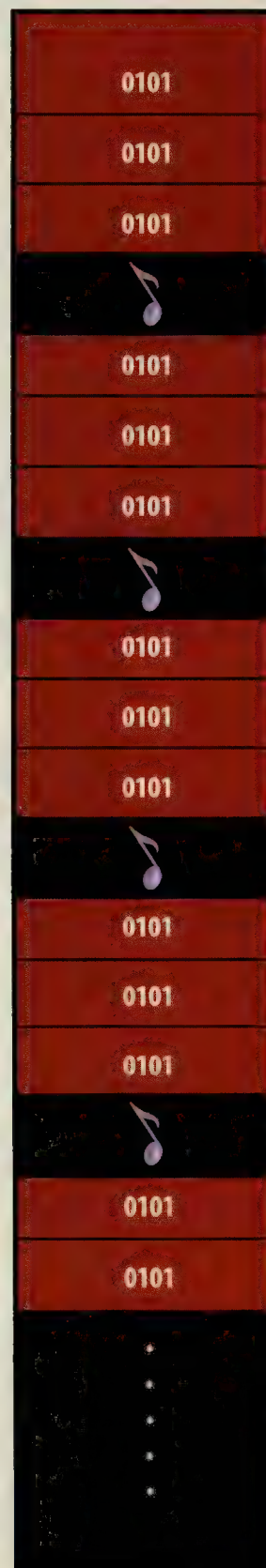
trade off increased playing time for somewhat lower fidelity.

In its most compact state, an XA-format disc can hold up to 18 hours of audio, while a multilingual disc can have as many as 16 parallel soundtracks in different languages. Also, when an XA Mode 2 track contains *interleaved audio* (a mixture of Form 1 data sectors alternating with Form 2 audio sectors), a drive can separate computer data from audio on the fly. An XA-compatible drive can send data back to the computer at the same time that it's playing audio, a trick that's impossible for conventional CD-ROM drives.

About the same time that XA showed up (1989), the first drives capable of writing to compact discs also appeared. (Up to that point, CDs could only be mass-produced in a pressing plant, which is still how the vast majority of CDs are made.) The recordable discs are known as *write-once* (WO) media, since a recorder can't erase data once it's written on the disc. The CD-WO standard describes how to write discs that will be compatible with conventional CD-ROM drives.

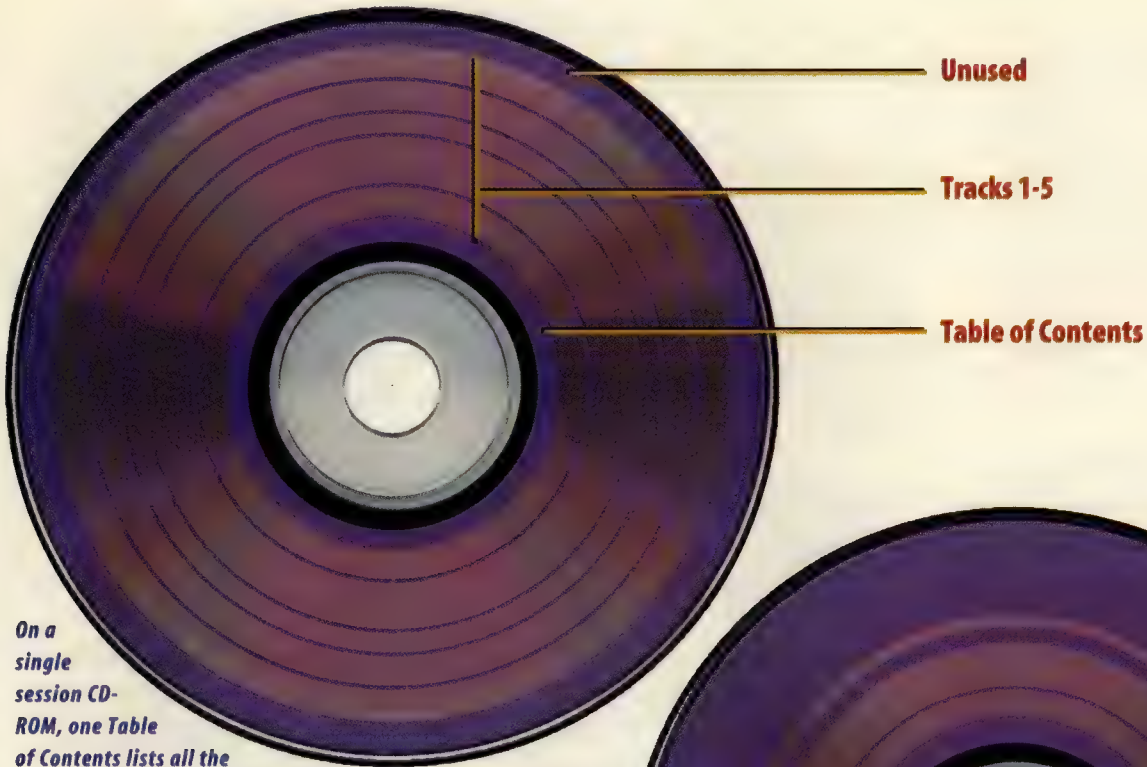
The CD-WO standard introduced *multi-session* CD-ROMs. Every CD or CD-ROM contains a *table of contents* (TOC), located in the *lead-in* area before the first track, which lists the size and location of each track on the disc. The arrival of CD-WO added an extra complication: most recorders can add additional tracks to a partially filled disc, but a CD's TOC must precede the data it indexes. Since there's no way to add new entries to the disc's original TOC, the recorder must write a

## CD-ROM/XA Mode 2 Track — Mixing Computer Data with Audio



*Audio and computer data can be interleaved on a CD-ROM/XA Mode 2 track. During playback, an XA drive separates data sectors (Form 1, red) from audio sectors (Form 2, black), playing sound at the same time that it reads computer data.*



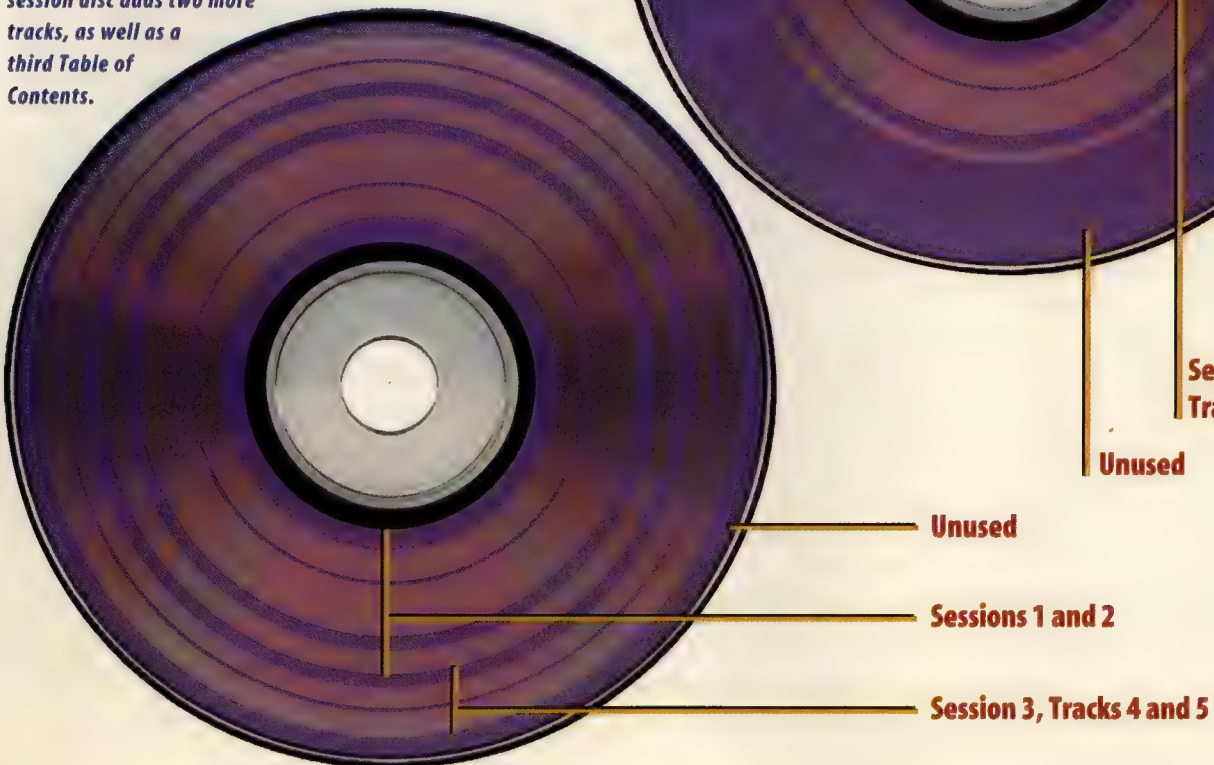


*On a single session CD-ROM, one Table of Contents lists all the tracks (five are shown here). All tracks must be recorded at the same time.*

*A multi-session CD-ROM, written in two sessions. Track 3, added in a second session, is the only entry in the second Table of Contents.*



*A third session on a multi-session disc adds two more tracks, as well as a third Table of Contents.*





complete session every time it adds data to the disc, beginning with a new table of contents that lists the new tracks. Unlike the rest of the CD-WO standard, multi-session discs aren't compatible with earlier CD-ROM drives. Most drives introduced in the last year are multi-session "aware," but older drives are programmed to look for a single TOC and will only find data from the first session of a multi-session disc.

### Photo CDs Use the New Formats

Kodak's Photo CD is the most common reason for concern about new formats, since Photo CD data is stored in CD-ROM/XA Mode 2 Form 1 sectors. From what we've seen so far, the original CD-ROM format would have worked just as well for Photo CD. But Kodak plans to add soundtracks and narration to upcoming variations on Photo CDs (the Portfolio and Photo CD Catalog systems), and these new types of discs can put XA's features to good use.

A drive that's fully compatible with Photo CD must also recognize multi-session CD-ROMs. With a capacity of around 100 pictures, a Photo CD holds about four rolls of film. By using the multi-session option for writable CDs, customers can use all the space on a disc without waiting to save up several rolls of film. Each time they add a roll of pictures to a disc, the photo lab's CD-ROM writer just adds another table of contents to the disc, pointing to the pictures written in the latest session.

Photo CD-compatibility has emerged as a new standard for CD-ROM drives, but many older CD-ROM drives can't handle the Mode 2 Form 1 XA sectors storing Photo CD pictures, and many more can't read multisession discs. The fix is occasionally as simple as updating the device driver that runs on the computer, while some other

drives can be upgraded to Photo CD-compatibility by their manufacturers. Most new CD-ROM drives are fully compatible, but a few exceptions remain. Knowing how confusing this can be for CD-ROM drive owners, Kodak has established an ongoing Photo CD certification program, and the Kodak Information Center at 1-800-242-2424 can answer questions about the compatibility of specific CD-ROM systems.

### The Promise of CD-ROM/XA

Conventional multimedia discs store pictures, text screens, sound bites, and interaction scripts in separate data files on different parts of the disc, and the drive must perform a seek operation to find each media element. CD-ROM drives are notoriously slow at seeking, and the result is a noticeable delay each time the program reads a new file. Most CD-ROMs include audio soundtracks, but since they're on different tracks from the file system, accessing a file always stops the audio playback.

CD-ROM authors use several strategies to avoid these interruptions and delays, including copying files to the hard drive during installation, and preloading large blocks of data into RAM to prevent later interruptions. While these approaches work fairly well on powerful multimedia PCs with fast CPUs, large hard drives, and lots of RAM, CD-ROM/XA is the only solution for low-cost players with limited RAM and no hard drive at all. The elements in a presentation can be pre-synchronized and interleaved into a single XA data stream, coming off the disc just in time to be used. This lets the CD-ROM drive operate in streaming mode, continuously reading the disc at its highest possible speed, an advantage on any system.

With its ability to mix graphics, sound, and text within a data stream in a single file, CD-ROM/XA has already produced some of the most impressive interactive CD-ROMs. The version of *Newsweek Interactive* for Sony's subnotebook-sized MMCD player, developed by Mammoth Micro Productions and published by The Software Toolworks, is an excellent demonstration of XA's potential.

CD-ROM/XA has found its earliest acceptance on low-powered systems, but more powerful computers offer another option: With the proper software, a faster computer doesn't need any special hardware to play XA data streams. Mammoth Micro demonstrated Software XA earlier this year, a program which de-interleaves, decompresses, and plays the audio in an XA data stream in real time using an ordinary sound card, a Photo CD-compatible drive, and the power of a 386 or 486 CPU. With the option to include Software XA on their discs, publishers will soon be able to produce a single CD-ROM that delivers the same high-quality multimedia on ordinary PCs, on PCs with XA audio adapters like those available from Sony and Hitachi, and on dedicated XA players.

Like Kodak's Photo CD format, the success of XA depends on publishers' willingness to release discs incompatible with most older drives. But CD-ROM drive makers have been very quick to embrace new formats — so look for CD-ROM/XA to become a popular platform in the months ahead.







# The Year of the Dinosaur

**D**inosaurs are the hit of 1993. A huge draw, in fact, thanks in large measure to the wild success of "Jurassic Park." But there's a great deal more to learn about dinosaurs than even the most popular box-office hit of all time can reveal, so it's only natural that CD-ROM publishers have turned their attention to the creatures' popularity.

Three dinosaur CD-ROMs have appeared so far this year, and they can be categorized fairly neatly. *Dinosaur Adventure*, from Knowledge Adventure, appeals quite clearly to younger kids, from the first through eighth grades. *Microsoft Dinosaurs* tackles an older audience, aiming at self-explorers in roughly middle school through high school. And *Dinosaurs: The Multimedia Encyclopedia*, from Sony Electronic Publishing, offers material for the high-school student and beyond.

## Mesozoic Mania: CD-ROMs Go Prehistoric

by Neil Randall

### *Dinosaur Adventure*

This Knowledge Adventure title is a DOS-based program that runs without problems under Windows. The main portion of the program is quite richly detailed, but the disc also contains three sections aimed specifically at pre-readers and very young readers.

The Dinosaur Talking Storybook

offers a narrated (but very short) story about dinosaurs, with each word highlighted as it is read. The idea is for the child to learn to read along, and it works well (although a variety of reading levels would have been nice).

The Name-A-Saurus activity screen speaks the name of a dinosaur, then asks the reader to click on the corresponding picture, and, similarly, the Read-A-Saurus activity asks for the appropriate spelling.



Both of these activities are useful, but somewhat lacking in imagination and depth. If the reader identifies all of the





pictures correctly, for instance, the Name-A-Saurus activity just keeps going: no fanfare, no congratulations, and no reinforcement beyond simply giving the next name.

The core of *Dinosaur Adventure*, though, consists of a multi-part screen with icons, text, a graphic of the world, and a large main window. The difference between the CD-ROM and floppy-disk versions is apparent here: on the CD, the text is narrated. And the amount of text is sufficient to help just about anyone interested in increasing their dinosaur knowledge. In fact, this main screen is considerably beyond the comprehension level suggested by Name-A-Saurus and the other kids' activities.

From the Globe window, you can isolate specific areas of the world for related information. The Library icon takes you to a representation of a card catalog, which operates as an alphabetical index. Or you can click on the arrow under the main view window to go forwards or backwards in time, observing everything from the origin of the universe through the latest dinosaur discoveries. Eight short movies are included, each showing a different dinosaur or, in one segment, the way dinosaurs moved. These movie clips are

well done, but you'll find yourself wishing for more.

One small feature, well worth emulating by other designers: If you forget to load your mouse driver before starting *Dinosaur Adventure*, it will load one for you. None of this annoying "can't

detect mouse driver" nonsense that accompanies far too many products.

### Microsoft Dinosaurs

Like all of Microsoft's recent multimedia releases, this title boasts an extremely attractive interface and an intuitive means of exploring the disc's many features. The six available sections are Atlas, Index, Dinosaur Families, Timeline, Guided Tours, and Dinosaur Movies. Each section takes you to a variety of options, and each screen offers a wide number of linked additional screens. Clicking on Atlas, for example, gives you a

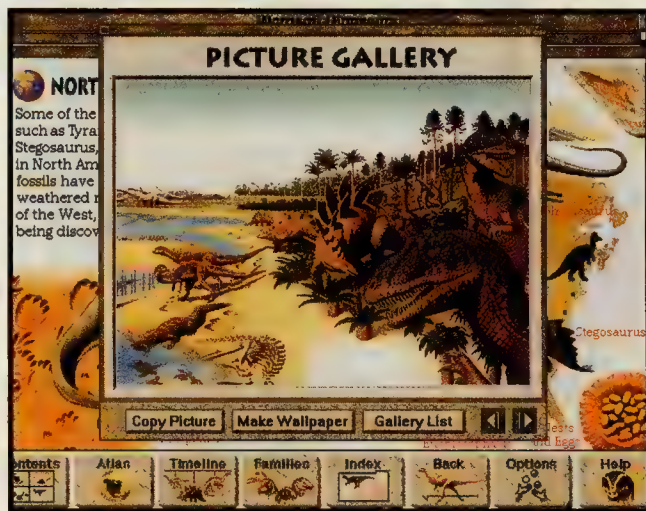


map of the world with continent names. Click on North America, and you get a graphic of the continent with 12 dinosaur

pictures superimposed on it. You can click on a named dinosaur to see the information screen about that creature, or on an underscored family name to go to another screen showing the members of that family (and then to the individual animal). Click on *Apatosaurus*, for instance, and the program displays a detailed painting of the long-necked lizard with several other linked screens, including *Defensive Tactics*, *Plant Eaters*, and *Traveling in Herds*.

Another of the linked screens explains why the beastie is no longer called the *Brontosaurus*, despite the fact that everyone on the planet knows that name better than the real one.

Six movies are included on the disc. "Birds and Dinosaurs" examines the



controversy over the possible evolutionary link between the two, while *Death of the Dinosaurs* looks at the various theories explaining the creatures' extinction. These and the three other explanatory movies are all cartoon styled, but the sixth, entitled "The Hunt," is a beautifully rendered simulation (from the BBC series, "The Dinosaurs") of a *tyrannosaurus* stalking and attacking a little plant eater.

Text screens are informative if, at times, brief. Text is not copyable, but screens can be printed. Pictures can be copied to the Windows clipboard using



the Options menu, and from here you're also offered two dinosaur-related screen savers. As a nice touch, the program lets you make any of the gallery pictures into Windows wallpaper, which means a glorious Jurassic scene can now greet you whenever you boot up. A good idea, and well worth the attention of other graphics-oriented CD-ROM producers.

Corresponding to *Dinosaur Adventure's* narrated text is *Microsoft Dinosaurs'* guided tours feature. There are 16 tours, each narrated, on subjects ranging from Dinosaur or Not? (i.e., what is a dinosaur?) through Bringing Up Baby, A Day in the Life of a Dinosaur, and Dinosaur Fashion Parade. Although well executed, the tours sometimes bear an overly patronizing tone, one that might easily put some kids off. The tours do, however, correspond well to the targeted age level.

## ***Dinosaurs!: The Multimedia Encyclopedia***

*Dinosaur Adventure* and *Microsoft Dinosaurs* differ from each other substantially, but *Dinosaurs!: The Multimedia Encyclopedia* is every bit as different once again. Like the others, *Dinosaurs!* attempts to educate, but its intended audience is clearly an older one. Perhaps

as a result of this, the entire tone of this CD-ROM, from its interface through its presentation, is slower, quieter, and more, well, scholastic.

The main sections are Age of the Dinosaurs, Dinosaur Directory, Story of the Fossils, Ask the Experts, and Dinosaur Gallery. Some of these sections are further divided into a variety of related sub-topics. Click on almost all of these sub-topics, and you'll get a fully narrated explanation, supplemented by a combination of illustrations, photographs, and, occasionally, videos. By working your way through the screens that follow, you'll learn a great deal about dinosaurs, their discovery, and the controversies surrounding them.

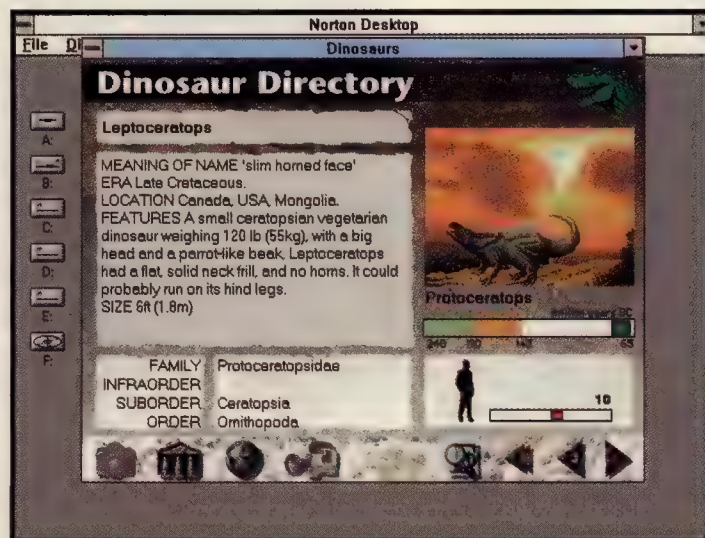
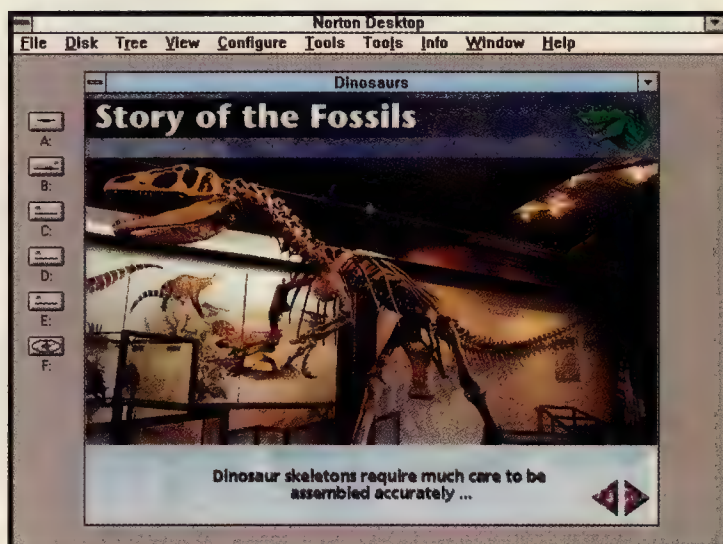
*Dinosaurs!* is a product of Media Design Interactive (MDI), a Sony affiliate based in Surrey, England. In a sense, its British origin explains the difference between this CD-ROM and the two U.S.-based designs. *Dinosaurs!* is nowhere near

as flashy as *Microsoft Dinosaurs*, and it contains none of the designed-for-children quality of *Dinosaur Adventure*. Even the narration shows the

difference: instead of the news-anchorish narrator of *Dinosaur Adventure*, or the slick edutainer that narrates the tours in *Dinosaur Adventure*, *Dinosaurs!* features Dr. Angela Milner, head of paleontology at the National History Museum in London. Many of her explanations come across, essentially, as lectures rather than presentations.

The result is a rich and extremely informative product, but not as much fun as the other two. Still, that's not a bad thing. If you'd like to hear a couple of experts explaining dinosaur concepts, sometimes in considerable depth, this CD-ROM is for you. But if you're buying a disc for younger learners, or those easily bored by more detailed or more sober accounts, try one of the others.

The point here is that dinosaur fans have been extremely well served. Along with space fans, in fact, they're probably the best served in the CD-ROM software market. Let's hope other subjects receive this level, and this variety, of multimedia treatment on CD-ROM.





# Software





# It's All in the Mix

## A Guide to Multimedia Presentation Software

**T**he multimedia presentation is a new form of communication, made possible by the impres-

sive audio and visual capabilities of today's personal computers. With presentation software, users can take all the components of multimedia — music, speech, text, animation, and video — integrate them, and store them as data files on ordinary computer disks.

There are plenty of good reasons to create multimedia presentations, particularly in the areas of business, education, and entertainment. And there are lots of exciting new applications for the multimedia mix, the most common being interactive textbooks, travelogues, and sales presentations.

Multimedia support has popped up in recent releases of many word processors, database managers, and other mainstream applications,

*Whether you want total control of your presentation or simply a way to piece together a modest multimedia sequence, you'll need the right software. Here's help on how to get your bearings and decide what's right for you.*

Tim Victor

Even a modest program like Windows Write, which comes with Microsoft Windows, can include sound, pictures, and video clips in its documents by using Windows' OLE (Object Linking and Embedding) facility. But the best results are achieved with tools specifically designed for multimedia production.

From simple, non-interactive movie-makers to professional multimedia authoring systems, the current crop of available programs offers a tremendous range of features. Choosing a package involves balancing power and flexibility against price and complexity, and weighing the amount of time you have to spend developing presentations, added to the time

necessary for learning the tools.

While this article is not a comprehensive buyer's guide to multimedia presentation software, our guided tour of the marketplace will visit the main presentation software categories, pointing out the most important features of a

variety of the products in each group.

### Linear Presentations

The simplest and most straightforward packages for multimedia presentation create non-interactive "multimedia movies." These products integrate different types of media elements, positioning them onscreen and synchronizing them in respect to time, and usually providing some way to select a clip from a longer media element. Video effects like colored backgrounds, fades, and wipes might also be offered to brighten up the transitions between the clips.

Like a movie, a non-interactive presentation will look the same every time you play it. There's no provision for user input, except perhaps for VCR-style pause/stop/rewind/fast-forward buttons. Still, this type of presentation suits many purposes, including slideshows, exhibits, and free-running ads and product demonstrations.

Support for a wide range of media is a prime requirement for this type of application. From still-pictures and sound to animation and digitized moving video, much of the value of a movie-maker program comes from its ability to incorporate a variety of media types, with different sources and a wide range of file formats for each medium.

Sound sources include digitized audio, MIDI, and, with a



CD-ROM drive, compact-disc audio. For digitized audio, popular file formats include WAV and VOC on PCs, with AIFF, SND, and SoundEdit files found on Macs. There's no file type associated with CD audio, but the program must be able to control the particular CD-ROM drive installed. PC presentation programs generally include CD audio support, either through a standardized CD-ROM device driver interface at the DOS level or through MCI (the Media Control Interface) under Windows. Without a similar well-defined interface, CD audio takes more work in a Mac application, requiring explicit support for each particular CD-ROM drive.

The same situation applies when it comes to MIDI music. Since Windows includes built-in support for playing MIDI files through any PC sound card, presentation programs typically take advantage of this functionality. As with CD audio, support for MIDI on Macs is typically limited to the most sophisticated presentation applications.

In the area of still pictures, support for a variety of graphics file formats is very important. Certain file types matter more on one platform than another, such as BMP files on Windows-based PCs or PICT files on Macs. But many other image formats are equally important for either PC or Mac — including TIFF, GIF, and PhotoCD.

Moving video is the most exciting medium for presentations, either as animation or digitized video. For Macs, this is the near-exclusive domain of QuickTime, although some programs also support PICS files or *Macromind Director* animations. A wider variety of formats flourish on PCs, such as *Autodesk Animator's* .FLI and .FLC formats, Microsoft's *Video for Windows*, and Apple's *QuickTime for Windows*.

Video can also be routed from an external videodisc or a videotape player, and is often displayed on-screen using a video-in-a-window card. Again, Windows programs can easily control these devices using MCI commands, while Mac support is more often limited to specialized applications.

Text is also an important medium, one that's often overlooked. Although it's indispensable for titles, credits, and on-screen lists of facts and features, not all presentation programs support text. But it isn't too hard to work around this omission — creating the text in a drawing program and exporting it as a bitmapped graphic. But programs that directly support text, in a variety of sizes, colors, and typefaces, help simplify the design process and save disk space in the process. (ASCII text is much more compact than a bitmap.)

On PCs, non-interactive movie-makers can be fairly basic applications, taking advantage of the powerful

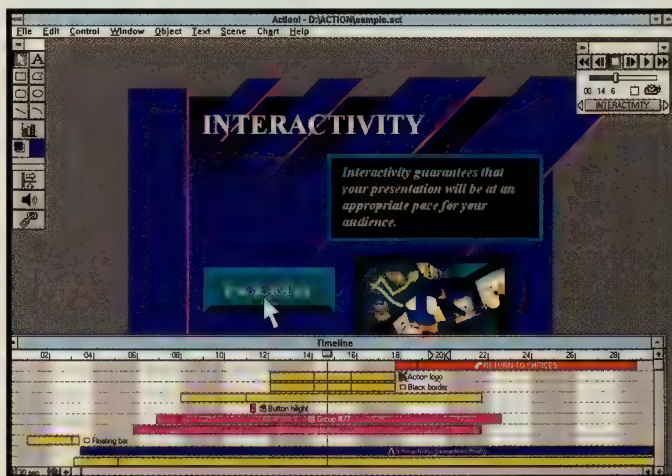
multimedia and device-control facilities built into Windows. Popular titles in this category include Q-Media Software's *Q/Media*, Lenel Systems' *MultiMedia Works*, and Asymetrix's *MediaBlitz*.

In contrast, Mac applications, such as Macromedia's *MediaMaker* and Passport Designs' *Passport Producer*, have to shoulder more of the burden themselves. Both include support for MIDI music and a variety of external devices, including CD audio, features which less-expensive Mac applications omit (e.g., the interactive presentation programs described below). Naturally, they're also considerably more expensive than their Windows counterparts.

Remember that most of these programs can't edit pictures and clips — they simply combine media that already exist. At the level of professional-quality authoring systems, we'll see some packages that include very sophisticated media editing tools. But as a rule, presentation programs specialize in synchronizing and integrating existing media elements, leaving the jobs of creating and editing to programs specially designed for each medium. If you wish to produce a presentation with original music and art, for example, you'll also need music-composition software and drawing or painting programs.

## Interactive Presentations

Popular presentation graphics programs like Aldus' *Persuasion*, Microsoft's *PowerPoint*, and SPC's *Harvard Graphics* have been around for a while. Designed for the creation of traditional business and sales presentations, the first versions of these programs were used to create slides or overhead transparencies featuring outlines, bullet lists, and an occasional chart or graph. With the growing power of personal-computer graphics and easily transportable notebook computers, their focus has shifted from



*The timeline view in Macromedia's Action! clearly illustrates the timing of events in an interactive presentation.*



hard-copy output to live video. Presentations can incorporate flying text, animated charts and graphs, and flashy video transitions between slides or screens.

While some of these applications have recently added multimedia support, programs like Asymetrix's *Compel*, Macromedia's *Action!*, and Gold Disk's *Astound* are specifically designed for sophisticated multimedia presentations. Along with the traditional business-presentation model and a full range of multimedia support, they add interactive control over the sequence as well as timing of the events in a presentation.

Besides giving extra sizzle to a sales pitch, an interactive presentation program is a surprisingly good tool for some other uses. In the case of *Compel*, Asymetrix includes a very effective tutorial for the program, written entirely as a *Compel*-created presentation. *Compel* might not afford the same degree of control as a professional authoring system, but like the other programs in this group, it's a very quick and convenient tool for designing tutorials, product demos, and other interactive presentations.

Don't expect any sophisticated scripting languages or macros in this class of programs. Each has a simple objects/properties interface, which controls the flow of the presentation and the behavior of the objects on the screen. A piece of text, a graphic, a video

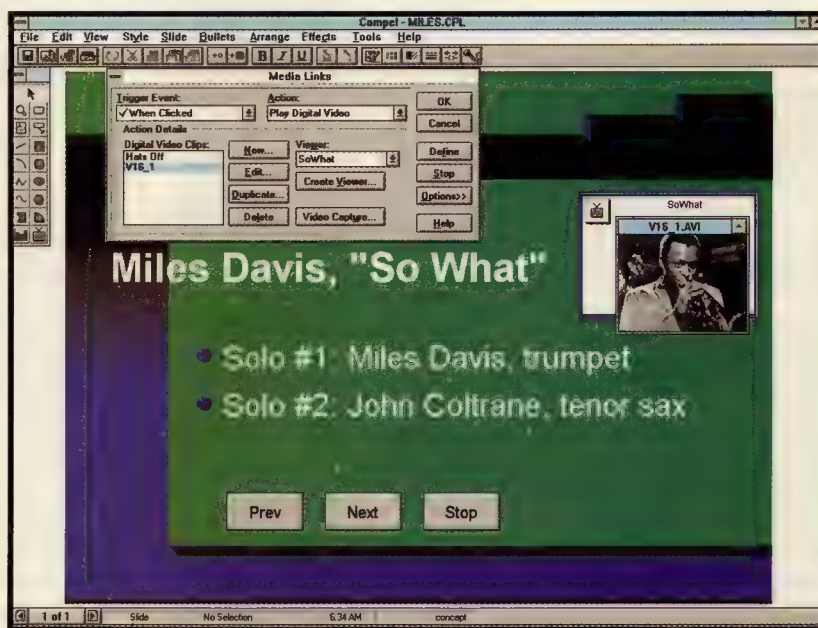
clip, or anything else on the screen is considered an object with a set of properties determining how it looks, when it appears and disappears, how it moves, and what it does when you click on it with the mouse. To change an object, just pop up a dialog box and edit one of its properties. What this model lacks in precision and flexibility, it makes up for in both speed-of-learning and ease-of-use.

Support for a variety of media types and file formats is also very important in interactive presentation programs. *Astound*, a Macintosh program, is notable for supporting most Windows and Amiga file formats, even importing files from several popular spreadsheet programs for use in creating graphs.

Presentation software packages usually include a separate player program, which can be freely copied and distributed along with presentations. This should certainly be a factor to consider if your presentations are to be sent to a fleet of salespeople, set up in dozens of classrooms, or handed out as promotions on floppy disk. *Astound* even comes with both Mac and Windows players, allowing for

cross-platform authoring on a single Mac. On the other hand, while Macromedia offers both Mac and Windows versions of *Action!*, neither version can play the other's presentations, and *Compel* is a Windows-only program.

Each package offers several *views*, displays that help in sequencing and organizing a presentation. All include a slide-sorter view, a simulated light table for examining and shuffling the order of the screens. For more precise control of a show's events, *Action!* and *Astound* also feature timeline views that show the relative positions of events in the presentation. In both of these programs, events are all firmly anchored to the timeline, and interactive inputs just shift the current time up or back on the line. In comparison, a *Compel* media event can be defined to execute whenever a key is pressed or a button is clicked. That's a more powerful interactive structure, but it also makes the program a little harder to use, since presentations can no longer be represented as simple timelines.

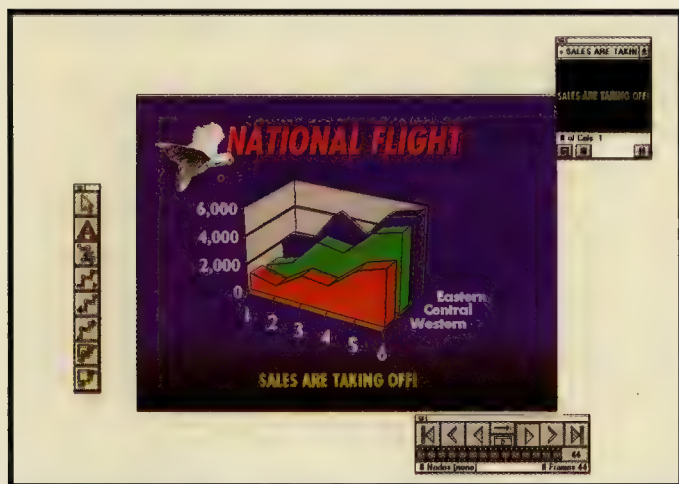


*In a Compel presentation, media events can be linked to any on-screen object, simplifying the design of sophisticated presentations.*

For Windows presentations, Gold Disk offers *Animation Works Interactive*. While it isn't a presentation-graphics program from the classic mold (its roots are in cartoon-style cel animation), the program is built around an object/properties model similar to the other titles in this category. It also supports a wide range of media, and it offers very sophisticated control over each element's motion and timing — as you might expect from an animation package.

*Animation Works Interactive* is also the only package to include a Windows MCI driver for playing its own presentations, including





**Animation Works Interactive, from Gold Disk, combines precise control of motion and timing with support for a wide range of multimedia elements.**

full support for user interaction. Through the Media Control Interface, any other multimedia-aware Windows program can include and control AWI presentations, just as though they were music or video clips.

### Professional Authoring Systems

Interactive presentation programs offer a quick, convenient way to work up simple multimedia shows, but more sophisticated productions demand more powerful tools. Professional multimedia authors need complete control over every aspect of the production, with a wider range of user input and interaction than most presentation programs support.

Some commercial CD-ROM titles are written as ordinary computer programs, using conventional programming languages. This approach delivers the ultimate in control, but it's also the most labor- and talent-intensive method, calling

for extensive programming skills in addition to the usual requirements of authoring.

Many of the most popular CD-ROMs were created with off-the-shelf commercial authoring systems. Rather than being easy to learn, authoring systems strive to be easy to use after you've learned how.

They're professional tools, designed for serious users with the time and motivation to master them. That doesn't mean that non-professionals necessarily have to keep their distance — hobbyists and educators make up a large part of the user base for most of these programs. But as a prospective user, ask yourself how much your application would suffer with a simpler tool. And if you decide to go with an authoring system, don't expect to be productive right away — it'll take a while to get the basics down.

Presentation programs offer graphical interfaces that are easy to learn and under-

stand, but pointing and clicking doesn't cut it for professional developers. It might be called "scripting," "macros," or an "authoring language," but authoring systems all use some form of programming to control the behavior of a presentation. But unlike C, BASIC, or some other general programming language, an authoring system's language is optimized for controlling presentations. Simple presentations are easy to program (once you've learned the language), while very complex presentations are possible with proportionally more effort.

Some of the earliest multimedia titles were developed on Macs with *HyperCard*, now available from Claris Corporation. *HyperCard* was developed by Apple Computer, and every Macintosh comes with a copy of it, but Claris' Development Kit offers documentation and utilities not available with the free version. Although not specifically designed for multimedia, *HyperCard*'s straightforward stack-of-notecards model, flexible HyperTalk programming language, and universal Mac support have made it a favorite for multimedia CD-ROM development. It was used, for example, to author Voyager's *A Hard Day's Night* and the Mac version of *Multimedia Beethoven*.

The popularity of *HyperCard* has given rise to a mini-genre of similar and compatible programs, including Aldus' *SuperCard* and Spinnaker Software's *Plus*. Besides being compatible with *HyperCard* and HyperTalk, these programs add extra features, including color support. Spinnaker offers both Mac and Windows versions of *Plus*.

Although not strictly compatible with *HyperCard*, Asymetrix' *Multimedia Toolbook* shows its influence. Its books and pages more than resemble *HyperCard*'s stacks and cards, and the OpenScript language is similar in principle to HyperTalk. Available only for Windows, *Multimedia Toolbook* includes plenty of sample presentations and clip media on CD-ROM, as well as a freely distributable stand-alone player.

*MacroMind Director*, from Macromedia, might be the most popular authoring system among CD-ROM developers. It's been used to create titles as diverse as *From Alice to Ocean*, *Rodney's Wonder Window*, *Clinton: Portrait of Victory*, and *Hell Cab*. Available only for Macintosh computers, it includes complete painting and animation models, plus a royalty-free Director Player for distribution with presentations. Players for Windows-based PCs and Silicon Graphics workstations are also available from Macromedia.

Microsoft's *Multimedia Viewer* is a publishing tool for Windows, with a hypertext model similar to the Windows Help viewer. It supports a full spectrum of media types, but its forte is text. Presentations are organized as chapters, with Viewer's powerful formatting, linking, and search tools driving the user interface. *Multimedia Viewer* has been used for developing dozens





**Presentations created with Microsoft's Multimedia Viewer use a word processor, such as Microsoft Word, with Viewer commands embedded in the formatted text.**

of text-based CD-ROMs, including Microsoft's *Bookshelf*, *Cinemanima*, and *Encarta*, and third-party titles, such as Compton's *Jazz: A*

*Multimedia History*.

Outside of Windows, there are several DOS-based alternatives, including *Multimedia GRasp* from Paul

Mace Software, and Mathematica's *Tempora Media Author*. Both packages include full-featured paint programs and support a wide range of video and sound boards.

## Educational Authoring

For educational applications, there's a class of authoring packages offering more power than a presentation program, without the formidable learning curve of a professional development system. Tools like Macromedia's *AuthorWare Professional* and AimTech's *IconAuthor* are designed specifically for education and computer-based training applications, with built-in test scoring and record-keeping features that would have to be written from scratch in a more general authoring environment.

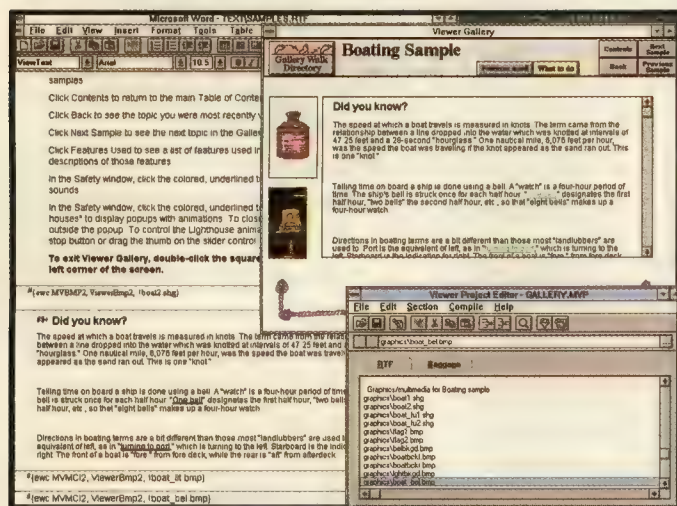
Both *AuthorWare* and *IconAuthor* use flowchart-based programming systems, with icons to represent different program operations. *AuthorWare* is available for both Windows-based PCs and Macintosh computers, with full binary compatibility between the two versions, while *IconAuthor* is a Windows-only program.

The prices of educational authoring packages might seem daunting (\$7995 for *Authorware Pro*), but the full price is typically intended for commercial developers and corporate training departments. If you think you might qualify for an educational discount, be sure to check with the publisher — it could really pay off.

## Designing Multimedia Productions

Multimedia production tools can build and play presentations, but they can't design them. It takes human beings to do that, and designing good presentations is a unique challenge. Desktop publishers understand how the appearance of a document helps to convey its message. In the same way, an interactive presentation's appearance can also tell the user how to control the program — and well-designed presentations invite further exploration.

The best source of ideas for multimedia design are the CD-ROMs you enjoy most. Study the discs that you find most interesting and easiest to use. You're likely to discover that the best titles employ clear, uncluttered screens, well-labeled controls and buttons, and a logical organization of the material — all elements of good design that you can carry over into your own productions.



**Asymetrix's Multimedia Toolbook comes with a rich library of sample applications and reusable code fragments, including widgets to control most multimedia devices.**

## Presentation Software Sources

**AimTech** 20 Trafalgar Square, Nashua, NH 03063 (800) 289-2884  
**Aldus Corporation** 411 First Ave. South, #200, Seattle, WA 98104 (800) 685-3594  
**Asymetrix Corporation** 110 - 110th Ave. N.E., Suite 700, Bellevue, WA 98004 (206) 462-0501  
**Claris Corporation** 5201 Patrick Henry Dr., Box 58168, Santa Clara, CA 95052 (408) 987-7000  
**Gold Disk** P.O. Box 789, Streetsville, Mississauga, Ontario, Canada L5M 2C2 (416) 602-4000  
**Lenel Systems International** 19 Tobey Village Office Park, Pittsford, NY 14534 (716) 248-9720  
**Macromedia** 600 Townsend, San Francisco, CA 94103 (415) 252-2000

**Mathematica** 402 S. Kentucky Ave., Lakeland, FL 33801 (813) 682-1128  
**Microsoft Corporation** One Microsoft Way, Redmond, WA 98052-6399 (206) 882-8080  
**Passport Designs** 100 Stone Pine Rd., Half Moon Bay, CA 94019 (415) 726-0280  
**Paul Mace Software** 400 Williamson Way, Ashland, OR 97520 (800) 944-0190  
**Q-Media** 312 E. 5th Ave., Vancouver, B.C., Canada V5T 1H4 (604) 879-1190  
**Spinnaker Software** 201 Broadway, Cambridge, MA 02139 (617) 494-1200





# Don't Know Much About History?

## CD-ROM Has the Answers

T. Liam McDonald



*CD-ROM may be the perfect format to make the study of history come alive. Here's what's making it out of the history books and onto disc.*

“**W**hat’s past is prologue,” Antonio warns us in *The Tempest*, unknowingly providing generations of history teachers with an epigram to instill proper respect in their students. But with over three millennia of recorded history, the study of history is no mean feat. The glut of primary sources, timelines, documents, and interpretive histories is enough to make even the stout-hearted quail.

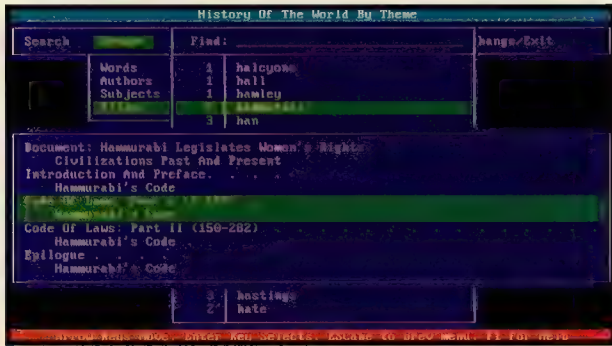
Now, in the modern age, the study of history may never be the same. CD-ROM is a historian’s dream come true: one small disc containing thousands of years of primary and secondary sources, all searchable, all available at the touch of a button. CD-ROM publishers are finally catching on, and history discs are appearing with increasing frequency. Almost all of these histories allow text to be printed or saved as ASCII files with simple cut-and-paste utilities. They also make *finding* that information easier with keyword and boolean (and/or/not) searches.

### World and U.S. Histories

The most comprehensive history disc to date is the Bureau Development, Inc.’s *History of the World*, which encompasses several thousand years in varying degrees of detail. The Bureau has been in the vanguard of educational CD-ROM resource material, producing several successful literature and history discs. *History of the World* is the first such disc to draw extensively on ancient sources, and what it offers is indeed marvelous.

The earliest document here is “The Code of Hammurabi,” while the most recent is an overview of 1992. In between, there’s a wealth of ancient material from every





**History of the World includes "The Code of Hammurabi," written in 2250 B.C.**

epoch of history with the exception of the 20th century, which is treated rather cursorily. All areas of human endeavor — cultural, religious, political, military — are chronicled in one form or another, providing a thorough cross-section of history prior to this century.

The material is easily accessed in a number of ways: by title, theme (e.g., exploration, religion, politics), geographical region, time period (e.g., Classical, Post-classical, Industrial), a section of pictures, maps, and illustrations, and another for sound clips. It's all presented via a perfectly utilitarian, DOS-based interface, accessible through a series of pull-down menus and sub-menus. It's as simple as browsing through a table of contents.



**A photograph of a sixteenth-century Cellini salt cellar, from History of the World.**

Works are also listed by author and keywords in the title, but the subject search and retrieval command is simply useless. For example, it recognizes neither "Civil War" (despite eight Civil War accounts), "World War 2/Two/II," (despite sound clips from Roosevelt, Churchill, Truman, Eichmann, Hitler, and others) nor "Alexander the Great" (despite numerous references to his exploits).

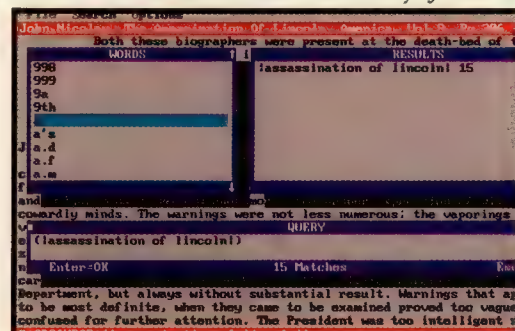
However, there's a nice mix of primary and secondary material in *History of the World*. Woodrow Wilson's *The State*, Prescott's *Conquest* books, Hegels' *Philosophy of History*, Gibbon's *Decline and Fall of the Roman Empire*, George Moore Foot's *History of Religion*, Rollins' *Ancient History*, the textbooks *Civilizations: Past and Present* and

*World History*, and others, provide excellent counterpoints to the first-hand battle accounts, government documents, and period histories. A number of religious texts (The Bible, The Buddhist Texts, The Bhagavad Gita, etc.) and cultural commentaries round out the social history, while two dozen sound clips and hundreds of illustrations add yet another level to the text. In short, *History of the World* is a terrific piece of software, and one which points to the true academic uses of CD-ROM.

The Bureau was able to draw on a more limited supply of material for its previously released disc — *U.S. History on CD-ROM* — due most likely to problems of copyright infringement. Relying heavily on books and reports from the Department of Defense, Army, Navy, Air Force, Marines, U.S. Congress, Library of Congress, and National Parks Service, *U.S. History* nonetheless provides an excellent overview of the march of events in America right up to Ollie North.

The National Parks Service Guidebooks to various historical sights are usually very well-written, and many of these (Gettysburg, Hopewell, various forts, etc.) have been carefully reproduced — photos, maps, and all. The complete — and lengthy — transcripts of the Nixon tapes are included (expletives deleted, of course), as is the full text of the *Iran-Contra Affair*, featuring all testimony and evidence. Government reports on drugs, technology, labor, equal rights, and the arts are punctuated by extremely thorough military histories from the various branches of the armed services.

An excellent complement to *U.S. History on CD-ROM* is *The CD-Sourcebook of American History: Volume 1, From Discovery to WWI* from Infobases International. This is another superlative product, more wide-reaching than *U.S. History* but, surprisingly, with little overlap. Where *U.S. History* heaps on mountains of specifics about select subjects, *CD-Sourcebook* provides a diverse sampler of Americana and American history. Absorbing all of Infobases' disk-based *First-Hand History of America*, and



**Performing a word search in The CD Sourcebook of American History.**



then adding numerous pictures and multi-volume historical commentaries, *CD-Sourcebook* packs the disc with 20,000 pages of material. Founding documents abound, along with treaties and first-hand battle accounts, staggering in their number and diversity. The beauty of the "first-hand" approach is that it offers vital, primary resources: history as



**CD Sourcebook contains samples of historical art, such as this painting of Columbus's arrival in America.**

it was written by those who lived and witnessed it.

The inaugural addresses of every president up through George Bush, important letters, personal impressions (Jefferson on Washington, Madison on Jefferson, etc.), and other ephemera make this an overstuffed attic of American history. A brief

scan of selections yields such intriguing titles as "Cartier Discovers the St. Lawrence" (from his own account), "Letters of Lafayette and Washington," "The Evacuation of New York," "Abolition Incites the Murder of Lovejoy," "The Voyages of the Norsemen," Tecumseh's speech to General Proctor, an eyewitness account of the death of Washington...and the list goes on. A very thorough series of World War I accounts and documents ends this volume, with a proposed edition to cover post-WWI to the present. The engine for *CD-Sourcebook* is the smoothest yet, opening with a "table of contents" that features Founding Documents, First-Hand Accounts and Documents, Interpretive Histories, an Author Search, list of Illustrations, and Bibliography.

These three products combined — *History of the World*, *U.S. History on CD-ROM*, and *The CD-Sourcebook of American History* — should form the cornerstone of any CD-ROM history library. Network versions are also available, and the applications for school and libraries seem endless.

A caveat is in order here: All three of the aforementioned products are guilty, at times, of the cardinal sin of historical study: Failure to Properly Cite One's Sources. The Bureau, it should be noted, often properly cites the source of the work presented, but far too often excises material, or prints it *in toto*, without proper background information. In lieu of actual citations, Infobases cites itself, along with several volumes of *The Harvard Classics* and a book series called *America*.

## The Good, Bad, and Very Bad

Moving from the sublime to the...well, not so good...we come to a group of products from Xiphias. This small company produces three discs comprising the Time Tables series: *The Time Tables of Business, Politics, & Media*; *The Time Tables of Science and Innovation*; and *The Time Tables of Arts and Entertainment*. Unlike the three discs already discussed, these are eminently avoidable. "Time table" and "Time line" functions allow two ways to get to a couple of scattered lines of information on various subjects. "Multi-media Buttons" allow access to a few photos, illustrations, "documents," quotes, and other items. These are few and far between. An "asterisk" icon accesses the "sources" used to write the few lines of information, but seems more like an attempt to plug books. A "globe" icon brings up the same map every time, with an arrow that points to the region of the world where an historical event took place. Music, animation, and video sequences are said to be included, but I couldn't find them. And the "research team" includes a photo of itself whenever it has no other source to cite. Miss these discs at all costs.

A standard — though hardly definitive — reference work for the study of World War II is Marshall Cavendish's *The Encyclopedia of WWII*. All 12 volumes — containing several thousand pages of text, 1,800 pictures (700 in full-color) and many maps — have been transferred to a single CD-ROM as *The Electronic Encyclopedia of WWII*. There's a lot of value here, including excellent accounts of all battles and campaigns. Detailed analyses of fighting forces — and their various branches — come complete with color renditions of uniforms. Cumulatively, the *Encyclopedia* is a chronological, narrative history of the war, without the alphabetical entries of a conventional encyclopedia. And it's here where an otherwise excellent disc suffers; in

assaying a narrative approach, detailed biographies and entries on specific subjects are lost, and non-military subjects are not handled in much depth.

The search engine works with keywords and alphabetical chapter subjects. Chapters can be accessed only in alphabetical order, so it's not possible just to flip through

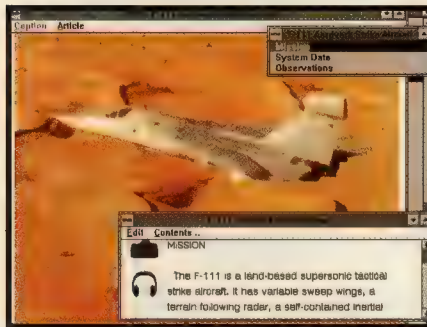


**Anti-aircraft fire lights up the sky in this dramatic archival photo from *The Electronic Encyclopedia of World War II*.**



chapters 1, 2, 3, and so on. Each major chapter has sub-menus listing all the photos as well as a helpful chapter outline. A lengthy bibliography and a detailed chronology round things out. There's quite a lot of meat here, but *The Electronic Encyclopedia of World War II* is far from definitive. A keyword search for "Hess" (as in Rudolf) yields a scant six passing mentions and no photos or biography of Hitler's most trusted deputy, nor is his epoch-making flight mentioned other than in the chronology. In many areas, this is a strong disc, but it is not the final word.

Quanta Press is an ambitious, independent publisher with a plethora of titles on the market, all featuring numerous photographs and wildly spotty quality. From the disastrous *World War II* and *U.S. Presidents* CD-ROMs to



**The F-111 Aardvark Strike Aircraft, from USA Wars: Desert Storm.**

the quite excellent *Viet-Nam* and *USA Wars: Desert Storm* discs, Quanta products run the gamut. The original Quanta products are crippled by the Textware search engine (in my opinion, the worst front-end on the market), but this has been rectified in part by a deal with Compton's New

Media that adds a new, simplified Windows front end to *U.S. Presidents*, *USA Wars: The Civil War*, and *USA Wars: Desert Storm*.

All the Quanta products come with hundreds of images, most of them quite sharp, and all in either PCX or GIF format. *World War II* has numerous photos, but only a timeline for text, while the text for *U.S. Presidents* is thin indeed. *Desert Storm*, on the other hand, comes chock-full of reports on the war, while *The Civil War* offers selections from government-produced histories such as *The Eagle's Talons* or James Robertson's *The Civil War*, which includes lists of battles and wounded. *Korea* seems to contain a fair amount of information, but it's hard to tell as there is no way to call up a table of contents or bibliography: only keyword searches yield any information, so browsing is out.

Best of them all is the massive amount of data on *Viet-Nam*, which utilizes the superior MediaBase interface to great effect. Chapters on Agent Orange, background info, a bibliography, chronology, and glossary, a complete list of Medal of Honor winners, detailed mission reports, orders, post-war analysis, statistics, and a listing of every name on The Wall with information on each makes this one of the most thorough military histories on CD-ROM yet, and Quanta's best.

The initial installment in *Time Magazine's* "First Draft of History" series from Warner New Media (now Time Warner Interactive) is an excellent little multimedia experience called *Desert Storm: The War in the Persian Gulf*. This is, in essence, an interactive magazine reproducing all of *Time's*

coverage of the war with the full text of all articles and editorials, numerous pictures, and additional sound-clips and documentary information. The interface is designed like a magazine, and data can be viewed



**Ulysses S. Grant — Union general, U.S. President, and one of the many subjects in USA Wars: The Civil War.**

either chronologically or by indexed topics such as Weapons, Personalities, Places (maps), etc. This is a well-produced, informative CD-ROM that bodes well for future installments in the series.

Still more history CD-ROMs are on the way. Quanta plans on improving its *World War II* disc, as well as adding titles on World War I and the Spanish-American War. WAE (which carries *all* of the CDs discussed in this article) has planned a comprehensive, three-volume history of the Viet-Nam War, featuring massive databases, with complete reports and files. The history of American Indians will be explored in *The Indian Question*, from Computing Objective, and even the U.S. Marines have gotten into the act with the release of their own *Desert Storm* reports on CD-ROM.

### History on CD-ROM: Publishers

**Bureau Development, Inc.** 141 New Rd., Parsippany, NJ 07054 (201)808-2700  
**Computing Objective** P.O. Box 51246, Indianapolis, IN 46251 (800) 745-9904  
**Infobases International** 1875 S. State St., Suite T-100, Orem, UT 84058 (800) 274-1048  
**Marshall Cavendish** 2415 Jerusalem Ave., P.O. Box 587, North Bellmore, NY 11710 (800) 821-9881

**Quanta Press** 1313 Fifth St., SE Suite 208C, Minneapolis, MN 55414 (612) 379-3956  
**Time Warner Interactive** 3500 Olive Ave., Burbank, CA 91505 (818) 955-9999  
**WAE** PO Box 349, Clarkston, WA 99403 509-758-9864  
**Xiphias** 8758 Venice Blvd., Los Angeles, CA 90034 (310) 841-2790





# REVIEWS

## REFERENCE

### Jane's Electronic Library

1992-1993:

### Volumes 1 and 2

DOS

Jane's Information Group

The distinguished Jane's Information Group of London is fast approaching its centenary anniversary in the publishing business. Founded in 1898 by naval journalist Fred T. Jane, Jane's has for years produced the authoritative books on weapons, military and civilian air- and sea-craft, and the tools of war.

Jane's fat, fact-filled books are updated annually, with all the latest advances and inventions in hardware meticulously chronicled. The company's reputation is based on timeliness, precision, and meticulous detail, and it's a reputation that makes it the dominant source of information for both military and civilian authorities on weapons and warfare.

Way back in 1989.— aeons as modern technology is measured — Jane's saw the potential for CD-ROM and began offering its massive reference works on searchable disks. Today, more than two dozen Jane's publications are available on individual CD-ROMs, while the massive Jane's Electronic Library offers all of the Jane's guides on two CD-ROMs. What would normally take up an entire bookcase (Jane's volumes are incredibly large) is reduced to about an inch of shelf space. Such a massive amount of specialized

information, however, comes at a price.

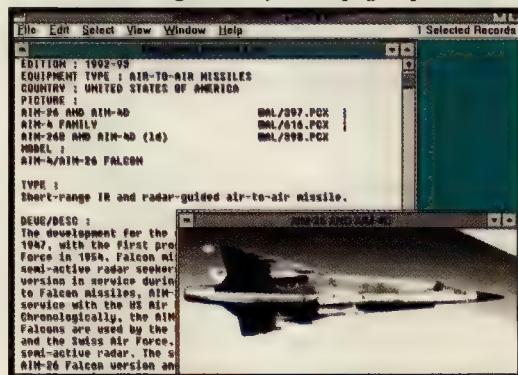
The individual Jane's guides appear on CD-ROM the same month as the hard copies appear in bookstores. Each March, all of the guides from the previous year are offered as a double CD-ROM set.

The 23 products contained in these two volumes of Jane's Electronic Library are *Jane's All the World's Aircraft*, *Ammunition Handbook*, *Armour & Artillery*, *Armoured Fighting Vehicle Retrofit Systems*, *Avionics*, *Battlefield Surveillance Systems*, *C3I Systems*, *Civil & Military Aircraft Upgrades*, *Fighting Ships*, *High-Speed Marine Craft*, *Infantry Weapons*, *Land-Based Air Defence*, *Military Communications*, *Military Vehicles & Logistics*, *Military Training Systems*, *Nuclear, Biological, and Chemical Protection Equipment*, *Radar & Electronic Warfare Systems*, *Security & Counter-Intelligence Equipment*, *Space Directory*, *Underwater Warfare Systems*, *Air-Launched Weapons*, *Naval Weapon Systems*, and *Strategic Weapon Systems*. Each of these is available as a separate product for \$795 each, or in the two-disc library for \$9700.

Two specific product groupings (with a suggested retail price of \$1350 each) are *Jane's Aircraft Identification* (containing *All the World's Aircraft* and *Civil & Military Aircraft Upgrades*) and *Jane's Naval Identification* (containing *Fighting Ships* and *Naval Weapon Systems*). An *International Defense Directory* and *International ABC Directory* provide complete searchable databases for all government and defence agencies and contractors. Jane's also produces customized CD-ROM products containing any

combination of the products listed above.

Three separate interfaces allow access to the vast wealth of data buried in these discs. The simple "Jane's" interface is a DOS-based search and retrieval front-end with Boolean search limiters. It's effective, but lacks the breadth and finesse of the more complex Romware interface from Nimbus Software that also comes with each disc. Offered in both DOS and Windows versions, the Romware interface allows for multiple search types, such as global (keyword), pages, product



title, equipment (both by word and phrase), country, model (word and phrase), manufacturers, and many more.

Most volumes are abundantly illustrated with .PCX images, and each comes with lengthy introductions on the state of the world, the state of the industry, trends, and other subjects of interest. Material can be printed or saved to disk, and complex search strings called Hypersets can be saved and used again and again.

The amount of detail and information on these discs is truly astounding, and the superior Romware interfaces make it all easily accessible. This is certainly not a product within the reach of the average consumer, but libraries, schools, defense contractors, well-heeled war buffs, and



Tom Clancy wannabes will find in it enough information to justify the steep price tag.

— T. Liam McDonald

**Jane's Information Group**, 1340 Braddock Place,  
Suite 300, Alexandria, VA 22314 (800) 243-3852

♦ ♦ ♦ ♦ ♦

## **Total Baseball: 1993 Edition**

DOS/Mac  
CMC

**B**aseball has a long history, with a healthy blend of stories and statistics. No other sport in the U.S. boasts as many instantly recognizable names, as many near-mythical moments, or as many kings, princes, or pretenders to the crown. It only makes sense, then, that the history of the sport find its way onto CD-ROM, a medium with enough room to handle the wide variety of details.

*Total Baseball* offers the history, the stories, and the game's myriad statistics. It also contains several hundred photographs of the game's great — and not-so-great — players. And, as a special treat, the disc holds sound files containing broadcasts of 20 of baseball's most memorable moments. The famous home runs of Bobby Thompson, Bill Mazeroski, Hank Aaron, and Carlton Fisk are all here, as is the final pitch of Don Larsen's perfect game and of Nolan Ryan's seventh no-hitter.

Most of this package consists of text screens, in a combination of essay-style copy and statistical tables. The stat screens are a fan's dream, covering the year-by-year performance of every player and every team. Also available are categories such as runs, hits, RBIs, stolen bases, shutouts, and so on.

The essays are probably the most interesting feature of *Total Baseball*. The first one offers insight into the invention

of the game (forget Abner Doubleday, folks), while another tracks the signing of Jackie Robinson, the majors' first black player. Well-written pieces on the top 100 players of the game, and on such topics as baseball attendance and the history of the All-Star game, provide even more detail.

Despite its obvious strengths, however, this product could be improved in several ways. The Discpass system that controls all the content clearly doesn't work well enough — future versions need a much friendlier interface (getting the sound clips to play takes considerable guessing, for instance). Searching is too difficult. Also, video clips should be an essential ingredient. It would be nice to see Reggie's three home-run performance in the World Series rather than just hear it.

As it stands, *Total Baseball* offers a great deal if you're willing to dig into it, and if you want a solid research tool. But it will disappoint those hoping for entertainment, which for many baseball truly is.

— Neil Randall

**Creative Multimedia Corporation**, 514 NW 11th Ave.,  
Suite 203, Portland, OR 97209 (503) 241-4370

♦ ♦ ♦ ♦ ♦

## **How Computers Work**

MPC/Mac

*Time Warner Interactive Group*

**A**s a kid, I used to receive crisp new Time/Life science and nature books every few weeks in the mail. For the time, these were immensely innovative books, with high production values, exciting illustrations, and readable, not-too-scholarly text.

I still can't hear the word *cell* without thinking of the see-through cell illustration, with its fuschia Golgi bodies, crimson mitochondria, and ribbon-like endoplasmic reticul — thanks to "The

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The Magazine of Personal Multimedia



Cell," one of the books in the Time-Life Science series. My wife reports a similar feeling about "Time," a book in the same series that told her as much as she wanted to know about time dilation in special relativity.

Time-Life Books is now moving to CD-ROM as the new medium for its publishing efforts. *How Computers Work* is an adaptation of the popular books of the same name. You've probably seen them advertised on TV in commercials featuring anxious PC users asking questions like "Will Windows hurt my computer?"

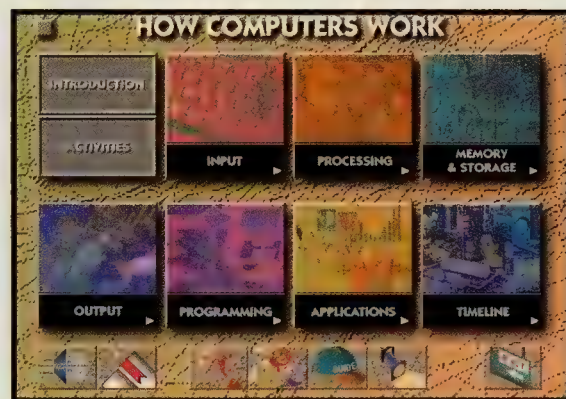
*How Computers Work* does deliver the goods on the inner mysteries of PCs. The main sections cover input, processing, storage, output, programming, common application types, and the history of computing. Sure, anyone can quibble with coverage of certain subjects — I thought too little emphasis was given to computer theorist Alan Turing in the history section, for example — but the information is accurate, as far as it goes, and the scope is certainly wide enough to provide novices with a taste of every important area of computing.

Text from the books is available both in written form and as narration read by cheerful actors over a series of slides. The pictures, many digitized in 256 colors, are clear and to the point. Some include simple animation. The series of illustrations depicting the difference between analog and digital data, for example, brought the topic home to my 11-year-old son in a way he had not grasped before.

Educational activities included with the disc feature a LOGO programming game that was old hat to him, but intrigued my eight-year old daughter. Other games that test users' skill at converting decimal to binary numbers,

adding binaries, and learning the binary ASCII codes held little interest for them and probably won't get much of a workout from other users either.

Also on the disc are sample applications from Microsoft, Aldus, and other major publishers — a bit of crass commercialism that the original Time-Life books never needed. The slick, attractive interface offers lots of ways to navigate around, so many in fact that you may have some difficulty remembering which button takes you to what level of material. I often found myself going back to previous topics I had read when all I wanted to do was return to the main menu. (How often do multimedia designers need to be told that every screen



should include a main menu button?)

Be sure to check out the perky tutorial that spells out the numerous interface features. Will *How Computers Work* on CD-ROM inspire students the way those old Time-Life books did? Nostalgia inclines me to answer in the negative — the response time of CD-ROM is too slow, the text is broken up into short chunks that impede the flow of ideas, and the illustrations, while attractive, lack the fascinating detail of that see-through cell. But my son ran through much of the disc in one long sitting, and plainly got a lot out of it — enough, maybe, to create fond memories of learning 25 years from now.

— Steven Anzovin

**Time Warner Interactive Group**, 3500 Olive Ave.,  
Burbank, CA 91505 (818) 955-9999

## The Software Toolworks Presents...Space Shuttle

DOS/MPC/Mac

The Software Toolworks

**F**rom John Glenn to the Apollo program to the various space shuttles, we have watched transfixed as massive spacecraft blaze fiery trails through the atmosphere, wondering how it would feel to be inside. With the recent release of *Space Shuttle*, The Software Toolworks has brought the same interactive experience to space flight that they brought to the animals of the San Diego Zoo. Like *The Animals!*, *Space Shuttle* uses extensive audio, video clips, stills, and text to provide a truly interactive learning environment. Whether you're newly interested in the shuttle program or a seasoned veteran of numerous dawn launches, you'll find a lot to admire in this easy-to-use program.

*Space Shuttle* is neither game nor encyclopedia, but instead a journey through the Johnson Space Center and various aspects of astronaut training, shuttle technology, and orbiting missions. Using a simple interface designed like a TV remote control, you can explore sections such as Orientation, Training, or Missions Launch. A glossary of terms makes tracking the lingo and acronyms a bit easier, while the Liftoff Game offers trivia questions as part of a simple board game.

The Orientation section provides a shuttle program history, complete with specs; a history of the various shuttles (Enterprise, Columbia, Challenger, Discovery, Atlantis, and Endeavor); and a tour of various shuttle parts. This last element is based on schematic drawings that can be clicked on for a description of the various components.

After Orientation, you can move into the Training section. Here, the various





gear, stages of flight, and techniques for living and working in space are described. Video clips, stills, sound, and narration make this introduction to the shuttle program really come alive. The section on living in space, for example, includes video clips and narration detailing meals, sleeping, air, hygiene, and exercise, while other video clips show the working robot arm, cargo bay doors, jet pack, and much more.

The largest section of *Space Shuttle* is reserved for the Mission Launch, where any of 53 historical shuttle missions can be launched. Mission goals, complemented by photos and biographies of the various crews, start things off. You can then launch the mission (video footage for each is included), and observe any of several mission highlights, again

with accompanying video. When the mission is over, choose the "landing" option and watch footage of that particular shuttle-mission landing.

*Space Shuttle's* development groups, Amazing Media and Follett Software, have done a marvelous job of creating a completely interactive experience. A simple, attractive interface makes accessing all this information effortless. Narration and video (very tiny, but

functional) are used extensively and to great effect. *Space Shuttle* is an outstanding introduction to all aspects of the space program for any age or level of interest.

— T. Liam McDonald

The Software Toolworks, 60 Leveroni Ct.,  
Novato, CA 94949 (415) 883-3000

♦ ♦ ♦ ♦ ♦

## **Global Explorer** Windows DeLorme Mapping

It's a geography lover's dream come true. *Global Explorer*, the latest CD-ROM title from DeLorme Mapping, is essentially a world atlas for Windows, and allows you to view the planet from whole continents down to areas of a few square miles. You can scroll anywhere on the globe, zooming in and out like a spy

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satellite's camera to examine any feature that might interest you.

The range of available views is impressive; it would take tens of thousands of pages in a print atlas to duplicate the detail here. Of course, some of that detail — such as a close-up map of Yampol or the middle of the Indian Ocean — is of questionable worth. Still, the geographically inclined will certainly delight in the sheer browsing potential of this product.

Don't look for a lot of bells and whistles in *Global Explorer*, though. As the company's moniker implies, Delorme Mapping is first and foremost a map publisher, and that emphasis is readily seen in this product. There's not a lick of sound support, and no pictures to illustrate any of the 20,000 historical, geographical, and cultural landmarks the program does include. These are simply described in a few sentences of text.

One extra feature is the rather curious inclusion of an Airnet Interface, which lets you plot airline flights between major airports all over the world — including connecting flights. It can even provide a list of locations you can reach via direct flight from a given airport. But while interesting, the Airnet Interface doesn't seem very useful. At best, it might serve as a kind of imaginary travel agent.

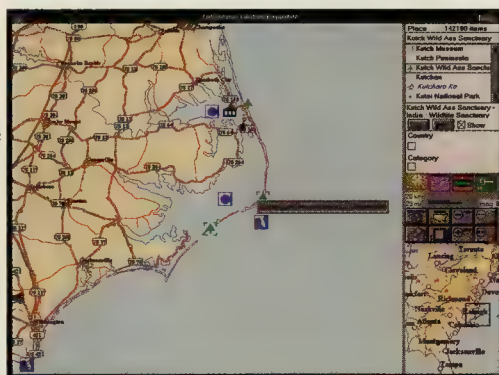
The program also includes a profile of countries and dependencies, which provides limited information on the population, government, economy, health statistics, geography, military, communications network, and wildlife of the world's countries and dependencies. It's kind of tough to get to this information, though: You must first select the Gazetteer, then check the Country box. Then you click on the small Info button that appears, and this gets you to the profile of the highlighted country.

From here, you can access a contents list of all the available country profiles, or search for a particular topic or country. A simple Countries and Dependencies Profiles icon would have been a nice touch.

*Global Explorer* leaves a bit to be desired in the graphics department. Even in the most topographically complex areas, with water, varying elevations, and symbols everywhere denoting those historic, cultural, and geographic landmarks, no map ever seemed to use more than 14 colors. A palette so limited obviously won't yield very exciting screens.

One more complaint, although admittedly a minor one: There's no way to measure the distance between points on a map. Sure, you can use the little scale in the map's legend, carefully pressing a ruler to your monitor and trying to do the math yourself. But I'm sitting at a computer, the machine meant to do this kind of work!

But as a no-nonsense atlas, *Global Explorer* is a remarkably detailed and thorough product. Despite a few clunks in the interface and a decidedly plain presentation, it's easy to get lost for hours just scrolling around the world. But then, I'm the type who sits and



pours over print atlases, too. If you enjoy geography, *Global Explorer* can be a lot of fun.

— Matthew A. Fierme

**DeLorme Mapping**, Lower Main St., PO Box 298,  
Freeport, ME 04032 (207) 865-1234

## Seven Days in August

Mac

Time Warner Interactive Group

Last year, Warner New Media and *Time Magazine* partnered to produced *Desert Storm: The War in the Persian Gulf*. Although it met with limited commercial success, industry insiders still regard *Desert Storm* as one of the unsung gems among multimedia CD-ROM titles. It provided a wholly absorbing, albeit darkly somber, view into the heart of modern diplomacy and war.

Now Time and Warner have teamed up to deliver *Seven Days in August*, an in-depth analysis of the fateful week that saw the Berlin Wall go up and the Cold War head into the deep freeze.

The heart of *Seven Days* is a beautifully produced montage of photographs, spoken word, original art, and music that vividly brings to life the circumstances and chain of events that led to the building of the Wall. The elements fit seamlessly together, and the production values are so slick that the absence of video footage is hardly missed.

The scholarly nature of *Seven Days'* rotatable discussions are good enough to keep news junkies away from C-SPAN and CNN for days. Historians, journalists, and ex-diplomats from both East and West augment the main storyline with recollections and analysis that lend impressive depth to the presentation. Detailed profiles of major political players provide a solid background for understanding the mechanics that drove events during the crisis.

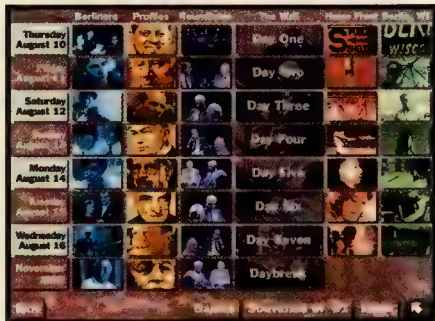
*Seven Days* also successfully focuses on the human side of the conflict by presenting the personal viewpoints of East and West Berliners and effectively juxtaposing their experiences and view of the world with small-town life in Berlin, Wisconsin. The contrasts between the two



are often poignant and always intriguing.

The pathos of the political events is artfully counterbalanced by "Home Front," a section that provides a window on the temper of the times in the United States of 1961. Vignettes highlight cultural fads, such as home fallout shelters, as well as important issues, such as the civil-rights movement. On the lighter side, we're treated to a potpourri sampler of television, pop music, and laughable advertising of the period.

*Seven Days in August* is a must-have for any history or political-science buff's CD-ROM bookshelf. Its skillful blend of disparate, but related elements, enable it to succeed as far more than a lesson in



history. By bringing the era, its people, and events into focus, *Seven Days* illuminates the foibles and fragility of our humanity and the consequences of conflict.

—Arlan R. Levitan

**Time Warner Interactive Group**, 3500 Olive Ave.,  
Burbank, CA 91505 (818) 955-9999

♦ ♦ ♦ ♦ ♦

## Time Almanac 1993

DOS/MPC/Mac  
Compact Publishing, Inc.

The weekly news magazines launched in the early part of this century began a journalistic tradition of insight, analysis, and summary. With photographs, in-depth reporting, and information-rich graphics, these magazines changed the way Americans get their news. Publications

like *Time* and *Newsweek* have influenced television ("60 Minutes," "20/20"), and are now moving to even newer technologies — multimedia personal computers.

CPI's *Time Almanac* 1993 contains more than 20,000 articles, more than 60 minutes of video, and more than 1000 photos, charts, and maps. And the interface makes it easy to search and manage this vast array of information.

*Time Magazine* readers will recognize many of the program's elements. The "Man of the Year" issues (or "Woman of the Year" or "Machine of the Year," as the case may be) are covered from 1939 to 1991 (and for the year 1934). Students of history and current affairs can read about subjects ranging from Henry Ford's mass production of war materials in WWII to scientific reports about the depletion of the earth's ozone layer.

Articles are enhanced with statistical information, maps, graphs, and charts from several sources, including the Census Bureau and the 1992 CIA World Factbook. Students interested in the Gulf War can pull up maps showing troop movements to go along with the articles that explain the story behind the maps. Students of American politics will appreciate the complete coverage of presidential elections from 1924 through 1992.

Navigating *Time Almanac* 1993 is easy, thanks to a menu system and a 14-button toolbar. The menu system puts most commands within easy reach; the toolbar icons are readily identifiable after a brief tour and a little experimenting.

In the Windows version, text, pictures, and graphs can be saved to files or copied to the Clipboard for insertion into other documents — like homework



assignments. Some articles have links to related information — indicated when the Links option appears at the top of the screen on the menu line.

The wonder of CD-ROM, at least in these early stages, is its storage capacity. The paper versions of *Time Magazine* issues would fill a closet and certainly be far more cumbersome to use as reference tools — and, of course, they'd be missing the audio and video segments that lend such drama.

For information junkies, *Time Almanac* 1993 is a worthwhile addition to the home reference library. It supplies a welcome source to both world and U.S. current events as they were presented in the popular magazine.

—Peter Scisco

**Compact Publishing Inc.**, 5141 MacArthur Blvd.,  
Washington, DC 20016 (800) 964-1518

♦ ♦ ♦ ♦ ♦

## Adventures

MPC/Mac

**T**his CD-ROM title describes itself as a "complete multimedia resource for worldwide adventure travel experiences." That's quite a claim, but the disc lives up to its billing with 425 megabytes of video clips, audio accompaniments, 2500 color photos, and more than 2000 pages of descriptive text covering a broad spectrum



of travel opportunities. "Adventure travel," by the way, doesn't just mean the more exotic thrills of skin-diving and hot-air ballooning (although they are included); it encompasses every kind of sporting, educational, ecological, cultural, and volunteering getaway.

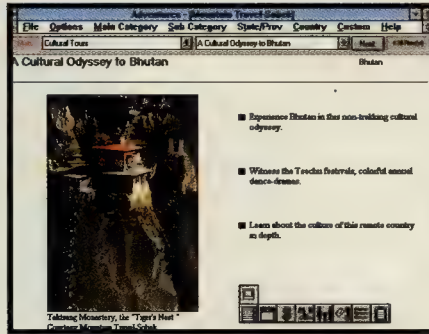
Whatever your interests or age, *Adventures* offers vacation suggestions from its interactive resources. Of course, it's still up to you to find the time and the money to go, but each listing tells you the best time of the year for visiting, who to call for making arrangements, how to get there, and what it will cost (in 1993 dollars).

Full installation of the front-end for this colorful database uses more than 11 megabytes on your hard drive. There's also a partial-install option with only a 1.5-meg overhead—but with a fast chip and a good cache, there's no appreciable speed penalty.

The main search screen allows you to specify a wide range of filters. You can indicate the kind of activity you're interested in, what part of the world you'd like to visit, the time of year, whether you'll be taking children along, the level of difficulty you're prepared to cope with, and so on.

Suppose, for example, you want to take the kids on vacation, somewhere in the U.S., but only during August (oh, yes, and you don't want to do anything with more than a "moderate" difficulty rating). Set your choices, and let the search begin—more than 40 different "adventures" are suggested, from a Blue Ridge bicycle tour to whitewater rafting in Maine.

The photographs and film clips have all been supplied by various tourist and travel associations and they are, not surprisingly, stunning enough to lure even the most jaded traveler into making just one more trek. How about visiting the Tiger's Nest Temple in Bhutan? How much would it cost? Too expensive? What



about taking part in an Outward Bound course in North Carolina? That's within the budget. Want a taste of what to expect? Watch the film clip...hey, this looks like fun.

At first glance, it's difficult to judge the exact market for this CD-ROM. Obviously it's a must-have for any travel agent, and would prove useful to other social clubs and organizations. But it's also a great catalyst for those of us who travel more in our daydreams than in reality these days.

Even if *Adventures* turned you on to just one unforgettable vacation experience, it would more than justify its price. I keep coming back to this horseback trip through the mountains in Quebec. In fact, with one click, I've copied the phone number over to the clipboard. Think I'll give them a call tomorrow....

— David A. Wade

Deep River Publishing, P.O. Box 9715-975,  
565 Congress St., Portland, ME 04104 (207) 871-1684

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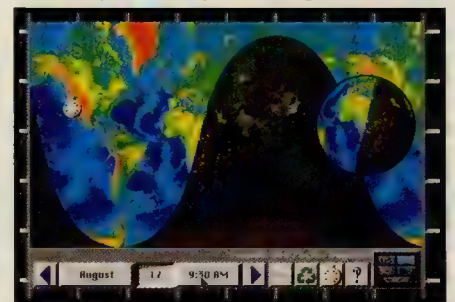
## Small Blue Planet

Mac/MPC  
Now What Software

Even if you've managed for the past year to shrug off the "Atlas CD-ROM of the Month" releases, Now What Software's *Small Blue Planet* is likely to tilt your axis of interest long enough to see Earth as more than just a collection of political boundaries and statistics.

This CD-ROM is segmented into five main modules with a consistent interface across each. "Global Relief" serves up a colorful topographic view of Earth's continents and ocean floors based on satellite data from the National Oceanic and Atmospheric Administration. The easy-to-use control panel, common to all modules, makes it a snap to zoom in or out, scroll, jump to other locations, or investigate highlighted points of interest.

If you get lost in the hills and valleys of the color topography, a click of the mouse brings up an inset of the area you're viewing in political map format, replete with countries, cities, and major waterways. Directly accessing the Political



map module offers a detailed atlas with vital statistics on the history, ecology, and terrain of individual nations.

The Chronosphere module demonstrates the movement of light across Earth's surface, with a dynamic terminator display that can be adjusted for the day of the year. The night portion of the Chronosphere also shows the use of artificial light on Earth's surface as detected by visible light-spectrum satellites.

The USA Relief map module is a highly detailed gray-scale map of the continental United States based on data from the U.S. Geological Survey. The bas-relief of the mountainous areas is striking, and this module also offers access to aerial views of most of the country's major metropolitan areas. The satellite photos and aerial views from the four main map modules are also accessible from a single



point dubbed, appropriately enough, the Gallery.

Since the maps in *Small Blue Planet* are derived from government and publicly funded sources, most of the images can be freely copied, as long as a credit line accompanies them. A provided marquee tool makes selecting and saving all or partial screens a snap.

*Small Blue Planet* gets high marks for usability and an alternative view of Terra Firma which clearly demonstrates that the world is far more than a collection of lines and names on a map. From its ecologically correct all-cardboard packaging to its striking views of Earth, it's a refreshing original among the herd of carbon-copy atlas CD-ROMs.

— Arlan R. Levitan

Now What Software, 2303 Sacramento,  
San Francisco, CA 94115 (415) 885-1689

♦ ♦ ♦ ♦ ♦

## **CNN Newsroom:**

### **Global View**

Windows/Mac

Compact Publishing Inc.

**A**s the information age heads into the 21st century, the fundamental concepts of communication are being redefined. The once-clear distinctions between traditional media forms are fading rapidly, and interactive multimedia is poised to become one of the most important news-delivery vehicles.


The informative power of this evolving technology is well represented in Compact Publishing's *CNN Newsroom: Global View*. This CD-ROM delivers a tantalizing collage of images and sounds designed to provide an overview of international affairs.

Video clips created from CNN news libraries introduce a wide variety of political and social issues in mini-documentaries. These brief overviews are then supported with an overwhelmingly large library of essays, statistical references, and colorful maps.

One of *Global View*'s greatest strengths is in something it *doesn't* do: the program does not attempt to recap recent

headline stories. Instead it offers a surprising amount of background information designed to increase understanding of major international issues. Examples include a video-clip explaining the devastating impact of Stalin's policies on Soviet agriculture. Another video explains the role that political actions play in the on-going series of famines in Africa.

The package is like a good social-



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studies teacher. Rather than provide conclusions, it encourages the user to draw his or her own conclusions, guided by thought-provoking introductions into the cause-and-effect world of sociology and politics.

All video footage is presented in a small quarter-screen window, and the quality ranges from fair to good. Nonetheless, the overall impact of the library of video footage is stunningly effective, dramatically bringing to life many major issues of the contemporary world.

The world atlas contained in *Global View* isn't fancy. However, although it lacks detail and interactivity, it is effective as a quick-reference source for information while browsing articles and viewing video clips.

The appealing video summary of current affairs is supplemented by a lengthy stream of traditional text, including State Department policy papers, the content of major speeches, and academic looks at the causes and effects of political events. And serious students will delight in the statistical and demographic profiles in the *World Fact Book*.

The interface is simple and adequate, but lacks much of the sophistication of other multimedia titles. Some users will find the quirks of the interface annoying.

Those interested in international events will be rewarded with many evenings of informative exploration. *Global View* is a wonderful source for stimulating family discussions about contemporary issues, and an effective tool

for the teacher wanting to breathe life into world affairs topics in the classroom.

— Randy Chase

Compact Publishing Inc., 5141 MacArthur Blvd.,  
Washington, D.C. 20016 (800) 964-1518

♦ ♦ ♦ ♦ ♦

## Americans in Space

MPC/Mac  
Multicom Publishing

Two decades after the United States put the first astronauts on the moon, that electrifying era of discovery is just a faded memory. Sadly, today's economic realities have once again relegated space exploration to a fantasy.

The space race is well documented, however, in photographs and movies, and those images are brought together magnificently in *Americans in Space*. More than 500 hours of narrated photographs and over an hour of videos track the space race from the V-2 rockets in WWII to the explosion of Challenger.

*Americans in Space* looks at the space race, tracking the failures, triumphs, and disasters of the U.S. space program through photos, movies, audio narration and text. It's fun, entertaining, and educational. Go through the program project-by-project and you'll know more about the space race than anybody on your block.

While some CD-ROMs are stingy with full-motion video clips, film is at the heart of this program. The first lunar landing, for instance, is documented in six videos, including a lengthy launch sequence, the descent to the lunar surface and, of course, Neil Armstrong's first steps on the moon.

Equally impressive are the slide shows, which portray each space project in detail. In the express tours, slide shows take the viewer on a tour of Earth as seen from space, provide background informa-

tion on the race to the moon, document the nuances of living in space, and chart the disasters of the space race.

The quality of both the still photos and the videos is excellent. Given the fuzzy images that were beamed from the lunar surface in 1969, the clarity of this program's videos is outstanding.

Narration throughout is superb, both in content and sound quality. In some videos, the voice of mission control takes the place of narration, and the results can be spellbinding. No other commentary is necessary as you watch the falling fragments of Challenger: "Obviously a major malfunction."

The interface is easy to navigate, with the main menu providing access to slide shows or to the mission-control menu, where the history of the space program is



broken down into projects, from Mercury to the space station. For just about every mission, you can see a photograph of the crew, listen to an introductory narrative, take a look at mission data, and then watch one or more videos.

One small gripe: Detailed information about the spacecraft is lacking, with only textual data provided. It would be nice to see some photos and schematics of the rockets and modules represented. That slight flaw, though, isn't enough to keep *Americans in Space* from being enthusiastically recommended.

— Lee Buchanan

Multicom Publishing, 1100 Olive Way, Suite 1250,  
Seattle, WA 98101 (206) 622-5530



# ENTERTAINMENT

## Maniac Mansion 2:

## Day of the Tentacle

DOS

LucasArts Entertainment

This is one of those titles that was obviously designed with CD-ROM in mind. Although its disk-based cousin is outstanding, it doesn't boast the terrific voice acting that makes the CD-ROM version even better.

The original *Maniac Mansion* introduced us to the wacked-out Edison clan — a family so comically twisted, they even surfaced in their own syndicated sitcom. In *Day of the Tentacle*, we meet the Edisons again. But while the primitive graphics and voiceless characters of that first game demanded that players flesh out the cast for themselves, the detailed artwork and impressive acting in *Day of the Tentacle* bring the Edisons to life in a way not even their television show did.

As the copy on the game's distinctive, triangular box states, *Day of the Tentacle* is an interactive cartoon adventure. The colorful, detailed, playful look of the game brings to mind the best work of Chuck Jones and Tex Avery. And on a fast machine, the frame rate is quicker than what you'll find in most of the children's cartoons around today.

As good as the animation is, the music and voice are even better — and just as delightfully cartoonish. *Day of the Tentacle* features some of the best voice acting in any game. Richard Sanders, *WKRP in Cincinnati*'s Les Nessman, is especially good. His delivery as the bookish Bernard is perfect, and his familiar voice will make *WKRP* fans everywhere warm to the game almost immediately.

The supporting characters are also excellent. George Washington sounds quite a bit like Jim Backus, and there's a hint of Woody Allen in John Hancock. Purple Tentacle has a deliciously evil voice, and Dr. Fred is the perfect crotchety mad-scientist. Only Laverne, whose ditzy airhead routine can wear pretty thin, fails to add to the product.



But Hoagie, Bernard's chubby, heavy-metal roadie roommate, steals the show. He spends most of the game 200 years in the past, chatting with our country's founders. As soon as you can, walk him up to the second floor of the old mansion to meet Betsy Ross. His ideas on creating a flag for the fledgling United States will have you rolling ("What if it had the face of the devil on it, with like red, white, and blue flames coming out of his mouth?"), and they're delivered in a hysterical mix of Texas drawl and California Valley Speak.

The game itself is a lot of fun, although not the toughest graphic adventure out there. Anyone familiar with LucasArts' past products will feel immediately comfortable with *Day of the Tentacle*. And although decidedly zany, the game's tightly woven storyline is never nonsensical. Whether you're freezing a hamster or helping Ben Franklin fly his kite, there's a definite method to your madness and a reasonable clue to lead you to a given action. Very few of the game's many puzzles are trial-and-error affairs, depending instead on the story's own cartoon-based logic. Anyone who's played a graphic adventure loaded with "leap of

faith" puzzles will appreciate the thought that went into this one.

— Matthew A. Firme

LucasArts Entertainment, P.O. Box 10307,

San Rafael CA 94912 (415) 721-3300

♦ ♦ ♦ ♦ ♦

## Lunicus

Mac

Cyberflix

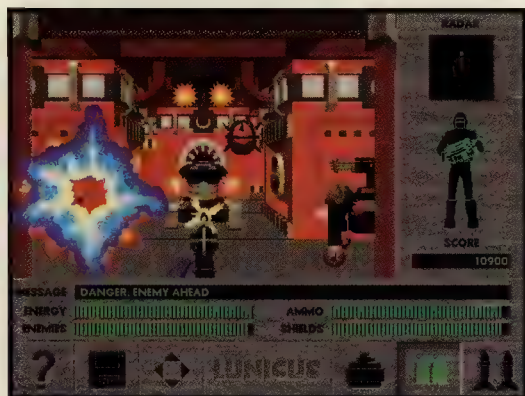
CD-ROM can certainly make the same old thing look a whole lot better. Case in point: *Lunicus*, a maze/shoot-'em-up game for the Mac.

Sure, you're going to save the Earth by scooting down little corridors and shooting at nasty aliens, but at least now you get to do it in a 3-D environment that responds with reasonable speed, unlike the first generation of 3-D games (remember *Slingshot Warlock?*).

*Lunicus*, which bills itself as "the fastest CD-ROM ever created," achieves its responsiveness with some simple programming tricks that will, in fact, soon be used in nearly all CD-ROM-based games. Files that must be accessed in sequence are placed next to each other on the disc to reduce seek times. Duplicates of crucial files are stored in many places on the CD to further reduce seek times. Files that must be accessed at high speed are cached to the hard drive or to RAM. And faster-moving 2-D sprites and bitmaps are used when speed and responsiveness are of the utmost importance.

The premise of *Lunicus* doesn't break any new ground, but then, the premise of an arcade game is rarely its key selling point. In the year 2023, paleontologists uncover ancient artifacts of alien origin. One of the devices is activated, attracting an invasion force of mechanized drones commanded by the merciless Hive Queen,





who envelops Earth in an evil hypnotic field.

The fate of the planet hinges on the skill and daring of a tiny fighting force stationed on Moonbase Lunicus, the only place the aliens have yet to conquer. You and your brave comrades must pilot a variety of attack craft and destroy the Queen's robot swarms in hand-to-hand and mech-to-mech combat through Earth's labyrinthine cities. Survive that, and you'll face the Queen herself.

But true to its claims, *Lunicus* is pretty fast. Moving around the 3-D corridors is effortless and quick, providing a superior "armored rat-in-a-maze" experience. The 3-D look of the game is a bit crude compared to those of such recent Mac CD-ROM games as *The Journeyman Project* or *Iron Helix*, but once you start fighting, you won't have time to breathe, much less ruminate on 3-D design techniques.

As with all such games, you'll live longer if you study up on armament types and on the various capabilities of the drones you'll be fighting. Save your game often, because you have exactly one life to lose. Before and after each battle, you can amuse yourself by socializing with 2-D animated "cyberpuppets." CyberFlix has even attempted some halfway decent lip-syncing between the animations and their clearly digitized voices.

There's a smidgen of role-playing in *Lunicus* — some puppets have valuable

information for you, if you ask the right questions — but you can't do much to develop your own character. Unfortunately, your character is unchangeably male; female gamers, too, will endure flirtations from the puppet warrior-women. Arcade aficionados who live for the rush of facing down digital death from swarms of killer drones will certainly love *Lunicus*. And 3-D game buffs

will want to check out the many cinematic sequences and trade banter with the sarcastic cyberpuppets. The only gamers who may not enjoy *Lunicus* are those seeking a leisurely or cerebral playing experience.

— Steven Anzovin

Cyberflix, 2309 Wagon Lane, Knoxville, TN 37920  
(615) 573-8849

♦ ♦ ♦ ♦ ♦

## Putt-Putt's Fun Pack

DOS/Mac

Humongous Entertainment

The simplest games often provide the most fun. The classic example of this phenomenon is the new, expensive toy sitting neglected on Christmas morning, while its young owner contentedly plays with an old yo-yo.

Humongous Entertainment uses this "simple is fun" concept as the basis for *Putt-Putt's Fun Pack*, a collection of six traditional kids' games on CD-ROM from its Junior Adventures line. The proceedings are hosted by Putt-Putt, the friendly cartoon who starred in Humongous's acclaimed debut title, *Putt-Putt Joins the Parade*. In *Fun Pack*, he also doubles as your opponent when two players

are required.

*Fun Pack* includes such perennial favorites as Checkers, Tic-Tac-Toe, and Hangman (here called "Cheese King"). There's also a Circus Puzzle Blocks game, "Remember!" (a variation of "Concentration"), and a pinball machine kids design themselves (although it's not strictly pinball since there aren't any flippers or any other way to keep the ball in play).

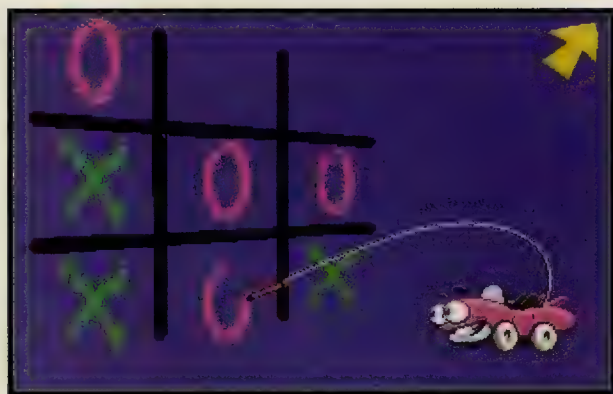
Putt-Putt's *Fun Pack* targets ages 3 through 8, and it's commendable that four of the six games have adjustable difficulty levels. (Since the pinball and Circus Puzzle Blocks games are free-form, difficulty levels aren't appropriate.)

There's nothing cloudy or complicated about the interface, and kids should take to it like ducklings to water. The title screen invites children to select an activity, and then, if appropriate, choose one of four difficulty levels.

Putt-Putt's also a good opponent in another way. He shows that it's OK to compliment another player's performance, and teaches kids that it's cool to be gracious in both victory and defeat.

Each of the *Fun Pack* activities helps young players develop various skills — whether by engaging their imagination, coaching their spelling, or honing their deductive skills.

One question remains: Will kids respond to an assortment of older games that pre-date video, not to mention video games? Given *Fun Pack*'s bouncy graphics





and infusion of animation (checkers that actually jump, and so on), the answer is yes. In fact, children may be surprised to find that they run out of gas before little Putt-Putt does.

— *Phill Powell*

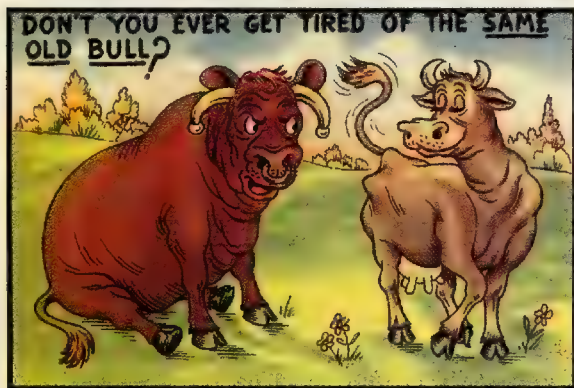
**Humongous Entertainment**, 13110 NE 177th Pl.,  
Box 180, Woodinville, WA 98072 (206) 485-1212

♦ ♦ ♦ ♦ ♦

## Tao of Cow

DOS/Mac  
Quanta Press

**B**asically, this is a database about cows. But it's not just any old database. Instead of the usual information-packed disc combining facts, essays, and other text with illustrations, photographs, and



video, *Tao of Cow* offers what its title suggests. Given that "tao" means "way," and that it represents the essential characteristics that make each thing or being in the universe what it is, this disc is not just about cow facts, but about the essence of cows. Sort of. Taoism also insists on leading a simple, unaggressive, spontaneous, thoughtful life, and cows certainly fit that as well. But enough with oversimplified eastern philosophy already.

When you enter *Tao*, you're presented with an uncomplicated but unattractive search mechanism. Type "milk," for instance, and you find that a number of "cards" hold that word. Hit

Enter and you'll see the contents of these cards, and here you get your first clue that this is a weird program. There's no information about milk, or cows for that matter, but rather a collection of, well, sayings. Choose one, and you can examine a photograph or cartoon to go with it. The sayings and the graphics aren't actually related, but the idea is that for each meditative idea, you have a nice, simple visual.

If you prefer, you can type COW at the DOS prompt, and the program will launch into a long narrative about cows, accompanied by still pictures. It's quiet, it's meditative, it's informative, and it's completely off the beaten CD-ROM track. It's also impossible to exit without waiting for the end or rebooting, and this leads to dramatically un-Taoist user behavior.

I can't honestly recommend *Tao of*

*Cow*. It's a truly neat idea, but it just doesn't come off. With less than one-sixth of the CD-ROM's capacity in use, and with the program's uninspired interface and equally uninspired collection of pictures and cartoons, it simply doesn't offer much. If it drew you inside and made you think like a cow, maybe it would work, but the

only thinking you'll do here is to suspect you've been milked.

— *Neil Randall*

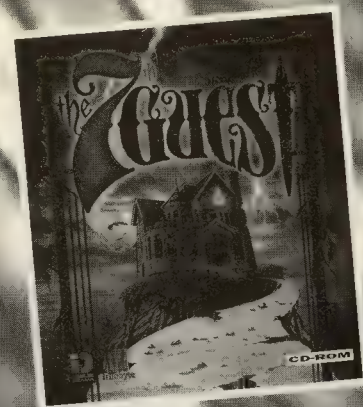
**Quanta Press**, 1313 Fifth St. SE, Suite 208C,  
Minneapolis, MN 55414 (612) 379-3956

♦ ♦ ♦ ♦ ♦

## Hell Cab

Mac  
Time Warner Interactive Group

**A**nyone who's a fan of computer-generated art can tell you who Pepe Moreno is, and Time Warner Interactive's Mac CD-ROM release of *Hell Cab* is



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bound to expand the circle of friends familiar with Moreno's work. The Spanish-born Moreno emigrated to the U.S. in the late 1970s and rapidly made a name for himself on the West Coast illustration scene before moving to New



York City, where he became one of the most highly regarded talents in comic-book art.

Moreno's drawing style is fluid and innovative, although at times I feel traces of influence from comic greats like Jim Steranko and Howard Chaykin. Moreno's melding of art and computers dates back to his purchase of an Amiga 1000 in the mid-eighties. He switched over to the Macintosh a few years later. In 1990, his hardcover comic *Batman: Digital Justice* hit the market and established itself as one of the landmarks of computer-produced art. An interactive CD-ROM version of *Digital Justice* is rumored to have been in the can for years, held in distribution limbo by snags in legal negotiations.

Despite those difficulties, the work spent on the *Digital Justice* CD-ROM did not go to waste. The experience gained on that project motivated Moreno to create *Hell Cab*, an original interactive CD-ROM adventure that admirably showcases the artist's talents and creative flair.

*Hell Cab's* storyline, like other titles in the "art masquerading as entertainment" genre, is a bit on the thin side. You

(a.k.a. "the victim") encounter a several-hour flight delay at the airport, and hop in a cab to take a quick sightseeing tour of New York. Rather than let you stiff him for being a buck short on the fare, your friendly driver has you sign a contract that

indentures you to a tour of climes less friendly than the Big Apple. To survive the game and save your soul (turns out the cab company is owned by Mephistopheles), you must make it through life-threatening scenarios in Imperial Rome, the trenches of WWI

Verdunne, and a remake of Jurassic Park.

Although live-action video, digitized images, and photographs are skillfully melded into the fabric of the game, *Hell Cab* succeeds more as art than entertainment. Its visuals are a real treat, but the game falls short in delivering solid play values (something a \$99.95 retail package should do). Although the player can make choices at critical junctures, the action is highly linear, and like a jigsaw puzzle, is unlikely to be returned to once solved. Too many of the Quicktime movies in *Hell Cab* are simply showcases for snippets of Moreno's (and other artists') previous work in computer animation, and add nothing to the game's plot development.

If you're an aficionado of computer-produced illustration, rush out to your local book store and pick up a copy of Moreno's *Digital Justice* if it doesn't already occupy a hallowed place on your bookshelf. If you like what you see, your next logical move may be to hop into a *Hell Cab*, lean back, and leave the driving and drawing to Pepe.

—Arlan R. Levitan

Time Warner Interactive Group, 3500 Olive Ave.,  
Burbank, CA 91505 (818) 955-9999

## Mad Dog McCree

DOS  
IBM EduQuest

“**M**ad Dog McCree and his band of cutthroats is a-ridin’ into town,” the old codger warns you. “What we need is a gunslinger. You feel like spreadin’ a little lead in harm’s way?”

Who could resist an invite like that, especially when it comes from a toothless old coot who looks like he just crawled out of a whiskey bottle? Even better, the mayor’s pretty daughter awaits a strong hero who will rid her daddy’s town of the nasty, evil men.

Thus begins the arcade video-game hit *Mad Dog McCree*, developed by American Laser Games, and now available on CD-ROM through IBM EduQuest’s FunStation label. This conversion of the original laser-disc game uses near full-motion video to place the gamer in a campy old west setting, complete with drunks, fair maidens, barkeeps, desperados, and assorted riff-raff. The result is an entertaining little shoot-’em-up which uses video to full effect.

The game begins with the Old Prospector asking you to get the sheriff out of jail. First, of course, you have to have a little “bottle-practice.” The interface is simple: a pistol-shaped icon represents your shootin’ iron, which is aimed by moving the mouse and fired by pressing the left mouse button. Drag the icon to the bottom of the screen, press the button, and the gun reloads. The gun is a six-shooter to start with, but if you hit enough steer skulls and spittoons, you’ll earn 12 shots.

Once you’ve got the hang of aiming and firing, it’s off to one of four locations for starters: the bank (to foil a robbery), the stables (to shoot up some of Mad Dog’s boys), the saloon (to get the keys to the jail), and the jail (to release the





sheriff). Once the sheriff is out, it's time for a gun-battle out on the streets. No matter how hard you try to save him, the sheriff bites the dust, but not before sending you off to the mines in search of a map to Mad Dog's hideout. Several more locations provide ample opportunity for bloodless gun play, all leading up to the climactic shootout with Mad Dog McCree.

An easy-to-use interface, excellent use of not-quite-full-motion video, and three levels of difficulty give this game a long play life. It's a fun-packed arcade shooter, with no pretensions to being anything else, and it's sure to provide hours of enjoyment for all but the most jaded cowpokes.

— T. Liam McDonald

IBM EduQuest, 4111 Northside Pkwy.,  
Atlanta, GA 30327 (800) 758-HOME

♦ ♦ ♦ ♦ ♦

## Iron Helix

Mac/MPC

Spectrum HoloByte

**H**urling through space toward the alien colony world of Calliope is the destroyer SS Jeremiah Obrian. The crew

is dead and the ship's computer, engaged in what it believes to be a war game, is primed to attack the defenseless planet with a top-secret biological weapon, code-named Iron Helix.

Virulent and unstoppable, Iron Helix

could destroy all life in the galaxy. Only a few precious hours remain. You and your science craft, the Indiana, are the last best hope for the universe. You intercept the Obrian and send in a series of remote probes to stop the computer before it's too late.

But first the unarmed probes must play a deadly game of cat-and-mouse with the ship's robot defender. Vital information has been hidden by the doomed crew in traces of DNA, and only when you discover the clues and gain access to all security areas can you defeat the defender and disable the ship's computer. That's the premise behind *Iron Helix*, a new release from Spectrum HoloByte (developed by Drew Pictures) that represents a stunning advance in the look and feel of CD-ROM games.

The 3-D animated graphics are truly top-notch, evoking a high-tech environ-



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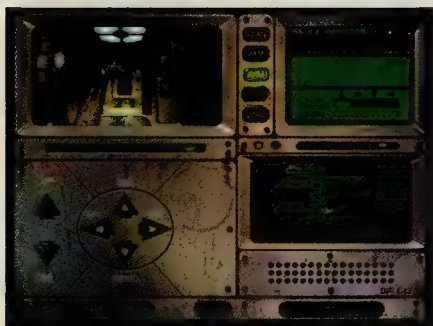
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ment that's both moody and menacing. The interior of the Obrian, where most of the action takes place, is complex and richly detailed, with remarkably smooth shading, subtle colors, and ominous lighting. The aural environment is equally impressive; the carefully selected sound effects convince you that you really are traversing abandoned metal corridors and ducking down narrow service chutes.

Though I'm not always engaged by maze games, and this title's storyline is hardly fresh, *Iron Helix* quickly became an obsession. Outwitting the robot defender took real ingenuity, not just a fast forefinger. A clean, easily mastered operating interface makes playing a pleasure; fussy, overcomplex controls often mar games of this kind, detracting from the pure development and execution of evasion strategies.

The game's response time is reasonably quick: not as fast as *Lunicus*, also reviewed in this issue, but quick indeed considering the level of detail in the animation. One tip: I found it absolutely imperative to keep maps and notes; the



program has a note-taking feature, but you may well want to prepare a sketch of the various deck plans in order to keep track of the stuff you find.

There are plenty of false leads; following them will cost you precious time. Another hint: If you're good at visualizing spatial positions from axonometric projections, stay in the map view that shows you all decks at once — you'll have a much better idea of where the

defender is at all times, and how to get away from it. But you sure won't save the universe by cowering in a corner. In short, *Iron Helix* is a must-have for anyone who wants to experience the cutting edge of 3-D gaming.

—Steven Anzovin

**Spectrum HoloByte**, 2490 Mariner Square Loop,  
Alameda, CA 94501 (510) 522-3584

♦ ♦ ♦ ♦ ♦

## **Dune** DOS *Virgin Interactive*

**T**he planet Arrakis, also known as Dune, is a desert wasteland with but one commodity: a unique melange known as "spice." Using spice, space ships can "fold space," traveling light years without moving. The substance is crucial to space travel, and it can *only* be found on Arrakis.

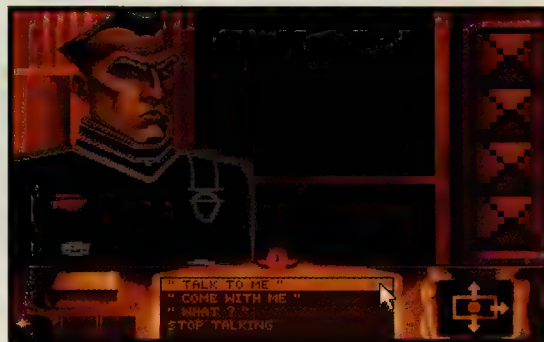
In a distant future, where feudal "houses" rule the galaxy, Arrakis with its horde of spice becomes the battleground for universal dominance. Only one house can rule the planet, and the machinations of Emperor Shaddam IV draw the noble Atriedes family into a fight to the death with the evil Harkonnen.

Thus begins *Dune*, a slick science-fiction game based on Frank Herbert's best-selling novels and the film adaptation by David Lynch. Designed by Cryo, a French development group, and released on floppy disk last year by Virgin Games (now known as Virgin Interactive), *Dune* was a surprise hit. The original game has recently been released on CD-ROM, with enough enhancements to make it well worth checking out.

*Dune* begins with some quite impressive use of video in which a lovely

host sets the background for the story. A slick, extremely stylish animated introduction follows, offering glimpses of some eye-popping enhanced graphics. A thumping synthesized soundtrack, along with heavy use of narration and dialog, create a fascinating, otherworldly milieu. The "ornithopter" — a helicopter-like vehicle that skims the surface of the planet — swoops and dives through dunes and rocky canyons, creating one of the most flowing first-person flight perspectives ever seen in a computer game. Graphics, sound, music: all are exceptional.

You assume the role of Paul Atriedes, son of Duke Leo and Lady Jessica Atriedes. This family has come to Arrakis to mine spice at the behest of the Emperor. The Emperor, quick to hedge his bets, also sends the Harkonnen to the planet, and they're not eager to share the spice. As Paul, you travel to various "sietches" (desert villages) to speak to the Fremen (the native people of Arrakis).



They agree to mine spice for Paul, and wonder secretly if he is the messiah foretold in their prophecy.

Game play involves visiting the various sietches, rallying the Fremen to mine and, later, to fight — and exploring the storyline and its many characters. Part adventure game, part sci-fi war game, *Dune* has something to please everybody.

— T. Liam McDonald

**Virgin Interactive**, 18061 Fitch Ave.,  
Irvine, CA 92714 (800) VIRGIN07



## Wild, Weird & Wacky

Mac/MPC  
MPI Multimedia

As digitized video becomes a key weapon in the battle for boardroom mind share, the video-clips business is booming. Unfortunately, the content tends to be repetitive. You can only put so many bustling employees, rocket launches, clever cartoons, and cute kids in your multimedia business presentation.

If you've exhausted the run-of-the-mill video clips, you'll welcome the offbeat dementia of *Wild, Weird & Wacky*, a bizarre collection of video clips from The WPA Film Library.

Culled from silent films, industrial movies, newsreels, home movies, and other sources, this strange collection of some 250 color and black-and-white clips — many with sound — depict the dark

side of the farce.

You'll see game-show contestants shoveling money into a scale, and a man in canvas wings leaping off the Eiffel

it's incomprehensible, if it's off-center, it's here.

The Mac disc includes two Hypercard-based Movie Browsers for choosing and viewing clips. The primary difference between the two is cosmetic. The 640 x 400 color interface presents a more attractive full-color search screen. The monochrome interface is functional and, lacking the processor demands of the color display, actually operates faster. Both interfaces include a scrollable listing of all the clips and a window

Tower. Bathing beauties from the 1950s take a politically incorrect (for the '90s) stroll along the beach. A man gets a bowling ball dropped on his helmeted head. There's even such "mondo" footage as a daredevil who has a sword thrust through his torso. Yecchh. If it's strange, if

that displays a brief description of the selected clip.

For best performance, a "Wacky Stuff" folder should be copied to your hard drive. This 2.5 MB file includes the two Movie Browsers, the QuickTime 1.5 extension, a Hypercard player, and Home Stack.



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## The Journeyman Project

Mac/MPC  
Presto Studios

The year is 2318 and the only wars worth taking note of are related to the price of 90986SX systems in retail computer stores. A gaggle of aliens who've taken the wrong turnoff at M39 in the Andromeda cloverleaf drop by to do lunch and offer the citizens of Earth membership in an intergalactic health club, and give us ten years to decide whether we want to sign up or not. A socially maladjusted villain, whose parents always made him eat his syntho-vegetables doesn't particularly care for the alien's taste in pressure suits, and decides to travel back in Earth history to muck up events so that we'll never end up pumping interstellar iron.

OK, so that really isn't the exact plot line as described in *The Journeyman Project's* documentation. It's close enough, however, and much more entertaining. The real McCoy is as pretentious

as a presidential campaign speech and is only slightly less believable.

In any case, your job is to go back in time, without the assistance of Michael J. Fox or Christopher Lloyd, and set things right again so that humanity can assume its rightful place in the group singalong at the peaceful civilization home on Altair IV.

It's obvious that *Journeyman* was a labor of love for the production team at Presto Studios. The program's visuals boast the most skillfully rendered and detailed artwork we've seen in a Macintosh game of this genre. The Presto gang has admirably succeeded in "out-Warlocking" Mike Saenz and Joe Spark's classic *Spaceship Warlock* in the art and sound department. The files that make up the original soundtrack are well suited to the game segments, and sound quality is top notch. *Journeyman's* 30 minutes of Quicktime video segments are skillfully integrated into the storyline and add breadth to the game's play values.

*Journeyman* has so much going for it visually and aurally, we were disappointed to find that its play value is not up to the quality of the artwork. Solving the puzzles of the different game segments, which may be played in any sequence, is not particularly difficult. Veterans of the original *Zork* series or D&D-style games will find *Journeyman* no more difficult than a romp through an orc-filled park.

On the other hand, there's nothing wrong with a leisurely stroll through a scenic vista as long as one can keep up a reasonable pace. Unfortunately, moving from scene to scene in *Journeyman* is



often irritatingly slow. Our test bed was a Macintosh IIfx with eight megs of memory and a double-spin Apple CD-300 drive. That may not offer as much oomph as a full-blown Quadra, but it's certainly enough hardware horsepower to expect reasonable performance from a relatively static interactive game.

Seasoned time trippers in search of Mac CD-ROM fare with real meat on the bones may leave this proffered plate of Presto digitization with growling stomachs. On the other hand, if you're a member of "the journey is the reward" clan, then *The Journeyman Project's* elaborate settings and slick-looking interface may be a satisfying CD-ROM repast.

— Arlan R. Levitan

Presto Studios, PO Box 262535, San Diego, CA 92126  
(619) 689-4895

♦ ♦ ♦ ♦ ♦

## Indiana Jones and the Fate of Atlantis

DOS

LucasArts Entertainment

Veteran gamers are resigned to the fact that movie tie-in titles are all too often cynical marketing exercises that scarcely resemble the original movies. But don't





make any similar assumptions about this CD-ROM game. *Indiana Jones and the Fate of Atlantis* is definitely an exception. Much of the charm and gaming satisfaction in *Atlantis* are owed to its success in capturing the Saturday-matinee spirit of the original film trilogy.

George Lucas and company are obviously exercising strict quality control over the various spinoffs from the

lucrative Indiana Jones franchise. Rob McGregor's half-dozen paperbacks expand on the Indy legend in a most entertaining fashion, and the colorful TV series, dealing with the hero's adventurous youth, boasts excellent production values and

solid educational content.

This latest installment in the saga moves our whip-cracking hero to CD-ROM while preserving all the essential elements that Indy fans have come to enjoy — the episodic narrative, the corny humor, the attractive heroine, those nasty Nazi villains, and a historical mystery which puzzles archaeologists to this day.

Preserving the cinematic look-and-

feel in *Fate of Atlantis* has required some compromises. Diehard gamers may feel a little let down by these tradeoffs. The designers have put you in the center of the stalls, as it were, so that the game unfolds in front of you with all the familiar visual syntax of the cinema (panning shots, overheads, close-ups, and so on). However, this means that you don't experience the same kind of involvement offered by the extended first-person viewpoint of such favorites as, say, *Ultima Underworld*.

The other point is that as the game progresses, you can proceed to the next episode only if you've collected all the right objects and/or performed the correct actions — there's little opportunity to retrace your steps or suddenly find out that you made a mistake way back when. There are three modes of play (solo

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action, solo thinking, and cooperative) that lead to the final revelation, so the game has excellent replay value — nonetheless, it still feels like you're being put through the hoops by the designers rather than determining your own fate as well as that of sunken Atlantis.

What advantages does the CD-ROM version offer over last year's debut on floppy disk? You'll save several megabytes of hard-drive space — all that's required is a small directory for saving games in progress. And, to complete the cinematic illusion, it offers digitized speech rather than on-screen print captions. The added "talkie" feature is excellently produced, with professional voice actors representing each character. This added dimension does a splendid job in creating an effective realism in the game environment.

It's highly unlikely that Harrison Ford will reappear as Indiana Jones on the silver screen; but if you've been dying to see another Indy movie, it's right here — from the trademarked splash of the adventurer's name and the rousing musical theme to the chases around exotic locations and the life-or-death puzzles which have to be solved in the nick of time — and all served up on a small, silver platter.

— David A. Wade

LucasArts Entertainment, P.O. Box 10307,  
San Rafael, CA 94912 (800) STAR-WARS

♦ ♦ ♦ ♦ ♦

## The Legend of Kyrandia

DOS

Virgin Interactive

**R**ole-playing adventures usually demand complete involvement from the player. There are manuals of trivia to memorize, maps to draft, and worlds in which to get completely lost. The dedicated adventurer realizes that

such requirements contribute to his total immersion in a fantasy world. The rest of us, however, tend to be frightened away by these burning hoops. But now there's a role-playing adventure for...well...the rest of us.

Don't get the wrong impression. You're *not* going to finish *The Legend of Kyrandia* in an afternoon's sitting. The game's 25 quests translate into a sizable amount of activity. Still, *Kyrandia* makes for very pleasant gaming, because there's little preliminary mental work involved — you can jump right in without pouring over background texts and acclimating yourself to an excessively complex interface.

In *Kyrandia*, you assume the character of Brandon, a clean-cut young hero. The story actually begins many centuries earlier with an ancient peace pact between the people of Kyrandia, a mystical land fraught with magic and beauty, and the forces controlling the Natural kingdom. Consequently, humans were given a giant stone known as the Kyragem, containing enormously powerful magic.

At first the Kyragem was used carefully and sparingly. Eventually, however, the people abused the privilege of unlimited magic. Their excess ended with the creation of the Order of Royal Mystics, who regulated Kyragem use.

Time passed, wars were fought and won, and Kyrandia entered an era of enlightenment. Unfortunately, this new age was cut short by betrayal and murder.



King William the Generous and his queen were slain by the jester Malcom, who absconded with the mighty Kyragem. Evil Malcom was finally restrained by the magic spells of Kallak (chief of the Royal Mystics, father of the slain queen, and Brandon's grandfather).

The current situation is this: Malcom has escaped imprisonment, and turned Kallak to stone. Now the malevolent jester seeks to exact revenge on all Kyrandians. As fate (and Virgin) would have it, Brandon alone has the potential to save his homeland.

Before you storm into battle against Malcom, however, you must assemble the four gems of Brandon's magic amulet. You do this by journeying through Kyrandia, engaging its offbeat (and often humorous) citizenry and performing various tasks. Winning each precious amulet stone is a sweet victory in itself, all leading up to your eventual glory as liberator of Kyrandia.

Mentally, this game is less taxing than many others of its genre. The level of deduction required to solve most of its puzzles isn't particularly rigorous, although it's doubtful that anyone, even habitual role-players, will feel insulted by playing *Kyrandia*.

The sights and sounds of *Kyrandia* contribute immensely to the overall



enjoyment of the game. Each screen is rendered simply but handsomely — and is packed full of rich colors. The sound and music are lively, something you can listen to for extended time periods (without nausea). And the voice acting rarely strays from the mark. *Kyrandia's* animation doesn't ever really bowl you over, but is sufficient to add visual spice to the proceedings.

*The Legend of Kyrandia* can be approached from several angles. For hardcore adventure gamers, it's a lighter diversion, perhaps regarded as a palate-cleansing of sorts. *Kyrandia* will be appreciated the most, however, by those of us intrigued by role-playing adventures, but wary of its more complex and time-demanding conventions.

— *Phill Powell*

**Virgin Interactive**, 18061 Fitch Ave.,  
Irvine, CA 92714 (800) VIRGIN07

## **PC Karaoke**

MPC

*Sirius Publishing*

**F**or many of us, the idea of hitting the stage on karaoke night at the local bar instills feelings ranging from self-conscious embarrassment to just plain terror. But deep in our hearts we might just believe that we sound exactly like Elvis, or Whitney, or whomever else we've just done a brilliant job of accompanying on the car radio (with the windows rolled up, of course). So maybe, if we could just once grab a microphone, step out in front of a sizzling band, and let loose — without a real audience....

Which is precisely what *PC Karaoke* lets you do. For the price of admission, you get a CD-ROM with 12 songs and a microphone that plugs into your sound board. And not one of those teeny-tiny

microphones you can easily swallow or lose in your shirt pocket. Nope: this is a bona-fide, grab-with-both-hands microphone, the kind that lets you fall to your knees on the stage and positively drip with emotion.

The 12 songs offer a good range of styles. "New York, New York" lets you be Frank, with "Unforgettable" you can be either Nat or Natalie, on "How Will I Know" you can test your voice against Whitney's, and "Twist & Shout" helps you understand why John Lennon once said that this song ruined his voice for good. My personal test came with "Oh Pretty Woman," "Can't Help Falling in Love," and "You've Lost That Loving Feeling," but I'm pleased to report that I sound astonishingly like Roy, the King, and whoever the main Righteous Brother was. Gratifying. Intensely gratifying.

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ons. A deluxe microphone (\$69) gives better sound, while a reverb mike (\$99) gives your voice greater depth. In addition, for \$15.99 each you can get a huge assortment of PC Karaoke CD-ROMs, ranging from Garth Brooks through Gloria Estefan, and even (dare we dream!) Paul Anka.

To get the most out of *PC Karaoke*, wire your sound card into your stereo (with standard jacks), then plug the microphone into the appropriate port in the sound card. Use the mixer that came with the sound card to adjust the microphone level to half volume or so. Then, when the main screen appears, select a song. The song will play, giving you everything but the lead vocal (the quality of the musical performances is consistently strong), and the words will appear on screen. Each word is highlighted at the appropriate place in playback, and you just follow along, singing (as it were) to beat the band.

Importantly, *PC Karaoke* runs under Windows. That means few if any problems with sound board compatability (all boards provide their own Windows drivers), and consistently good graphics. One warning, though, for those with ATI graphics boards which offer the "large font" option: use "small font" to avoid having the text



extend beyond the window.

*PC Karaoke* is superb partyware (to coin what I believe is a new term). My daughter used it at her eighth-grade graduation party, and it was a huge

success. This package is a great deal of fun, and it delivers what it promises.

— Neil Randall

**Sirius Publishing**, 7320 E. Buttherus Dr., Suite 100,  
Scottsdale, AZ 85260 (602) 951-3288

♦ ♦ ♦ ♦ ♦

## Microsoft Golf

MPC

Microsoft

In its earlier floppy-disk version, *Microsoft Golf* was a Windows-based re-presentation of Access Software's superb golf sim *Links*, and that hasn't changed here. What the CD-ROM edition adds is a wide variety of sounds, golfing tips, and course fly-bys (i.e., aerial spans of the hole you're playing).

As is increasingly common for CD-ROM products, the setup process lets you decide how much to install to the hard drive. *Golf's* setup screen is a bit confusing at first, because it presents all the options with the check-box already filled in. Instead of checking the options you want to put on the hard drive, you uncheck them instead. But the need for CD-ROM is clear —

moving everything to the hard drive would use up just under 90 megabytes. With all options checked, *Golf* uses up less than four megs of your drive, considerably less than the floppy version.

This CD version of *Golf* doesn't substantially improve on the original game. In fact, there's very little difference, except that this one is somewhat faster even though it

accesses the CD-ROM. *Golf* still has the problem of too small a playing window in high resolutions, or too cluttered a screen at lower resolutions. It's not nearly as clean a screen design as *Links*, on which

it's based, or *Links 386 Pro*, beside which it still pales.

What the CD-ROM version does improve upon are the game's peripheral features. All kinds of new sounds are available, including some blatantly silly entries like desert music (for those sandtrap moments) and cows mooing (for those far-off-the-fairway shots). The game offers some very attractive fly-bys of the Torrey Pines course, which ships with it, although if you add other courses, fly-bys aren't available.

Further, the playing tips are now Video for Windows snippets, equally



useful but also a nice example of the kind of multimedia use any CD-ROM publisher can take advantage of. Finally, the help system is quite extensive, and it includes animated demos of aiming and swinging, the two crucial parts of the game.

*Microsoft Golf* still needs a full upgrade, but MPC owners will be glad to see this version. It partly fulfills the need for serious Windows-based games, and it demonstrates that large, elaborate Windows games should all be on CD-ROM in order to add features and preserve hard-drive space. Ideally, Microsoft and Access should work together to offer a newer and spiffier version of the game, complete with all available courses, on one CD-ROM — but until that happens this one is more than adequate.

— Neil Randall

**Microsoft**, One Microsoft Way, Redmond,  
WA 98052-6399 (206) 882-8080



## Sherlock Holmes, Consulting Detective: Volume 3

DOS/Mac  
ICOM Simulations

**A**ny game that makes it to a third volume has achieved some level of status and success by dint of its survival. Whether this is merited by quality is another story, as we know from the likes of such films as *Hardbodies II* or *Night Eyes 3*. ICOM Simulations' first Holmes title was in the vanguard of CD-ROM entertainment. It was not necessarily good, but it was the first of its type (video-based) and therefore is noteworthy.

Now in its third edition, *Holmes* has become like the dotty old aunt that shows up at family functions: no one has the heart to tell her to go away. But, as with most dotty old aunts, you develop a sort of grudging fondness.

And so we come to what is probably the last *Holmes* game of this series. It's very much like its predecessors. Sure, some new doo-dads have been added to the video-playback utility, but these are trifles. In other words, the new *Holmes* is like the old *Holmes*.

And what is the old *Holmes*? It's a mystery game using extensive video sequences to depict the comings and goings of Sherlock Holmes and Dr. Watson. The period sets are a little better this time out, and the acting rarely strays from the level of an episode of Masterpiece Theater. Video scenes are quite well done, despite their 15 frames-per-second speed, and the interface is functional.

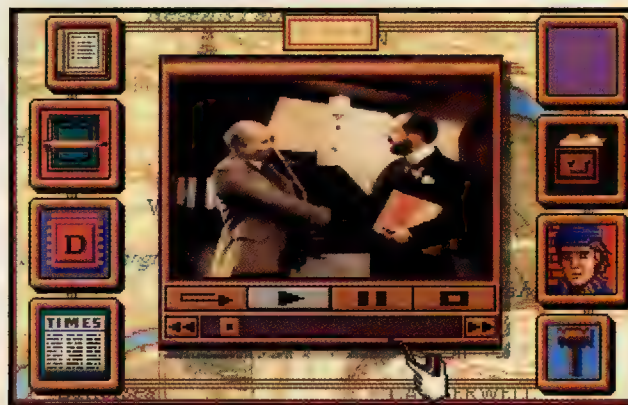
You use various items such as the phone book, Holmes' notebook, the Baker Street Irregulars, or the files, and you visit places and gather facts related to the mystery at hand. Going to the right locations triggers short scenes in which you

learn important information, and each bit of it leads you closer to solving the case.

Most frustrating is the fact that, even after you know the solution, the court proceedings will not continue until certain scenes have been viewed. The game then has the gall to base success on "points" for visiting the fewest suspects needed to solve the case. (The fewer people you visit, the fewer points you accrue.) The first game has a suggested score of 85, but I racked up about 485! The suggested scores are designed to keep you coming back for more until the score is suitably low, but they are so low that they're nearly impossible to achieve — not to mention that few gamers will replay a mystery they've already solved. As for playing time, I clocked in at a record two and half hours for the entire game, lousy score and all.

All gripes aside, it should be pointed out that what game there is to *Holmes* is quite entertaining. Carefully jotting down meaningful phrases from video clips, visiting suspects and witnesses and the daffy mortician, nabbing the suspect, etc., are all a lot of fun.

Like the earlier series' titles, Volume 3 has three mysteries — "The Solicitous Solicitor," "The Banker's Final Debt," and



"The Thames Murders" — all of about average difficulty. It's all good while it lasts, but it just doesn't last long enough.

— T. Liam McDonald

ICOM Simulations, 648 S. Wheeling Rd.,  
Wheeling, IL 60090 (708) 520-4440

## Jutland

DOS  
Software Sorcery

One of the first CD-ROM-based military simulations to reach the market, and the first naval sim in this format, *Jutland* covers a fascinating, as yet largely ungamed, area of military technology: the age of the great battleships.

This sim puts the CD's storage capacity to good use in the area of graphics. Beautifully detailed images of great warships fill the screen, their weight, size, and overwhelming brute power ably conveyed by the animated sequences that show them proudly cleaving the sea.

A richly scored and atmospheric soundtrack provides original background music (along with some period pieces and the inevitable "Rule, Britannia" and "Deutschland Uber Alles"), and the sound effects — particularly the throaty thunder of a battleship's broadside — are vividly effective.

You can play single battles, arranged in gradually increasing complexity until you reach *Jutland* itself, the largest battle ever fought solely between surface warships, or you can enlist in either the

British or German navies and play a campaign game. In between battles in the campaign mode, you see actual World War I newsreel footage, cleverly edited to seem like newsreels of your own exploits.

A simple-to-use camera utility let's you take

snapshots of your battles and save them in a "photo album" file. This is very useful to have if you do something extraordinary — like drop a 15-inch shell into a battleship's magazine — and you want to capture the images to show to your friends.





*Jutland* could stand improvement in a few details. There's no funnel-smoke shown coming from any of the ships (giving the battles a strange "clean" look, despite the fact that the footage contained in the game itself shows all these ships belching thick, greasy ribbons of coal-smoke). The "orders" screen could use a revamping (for no logical reason, the default "order" is one that will make your ship steam in a tight circle unless you enter another order before exiting that screen).

Even so, this game's excellent production values will probably be a major deciding factor for most potential buyers. Certainly, if you have an interest in naval history, you at least have to see this breathtaking simulation.

— William R. Trotter

**Software Sorcery**, 6390 Greenwich Dr., Suite 180,  
San Diego, CA 92122 (619) 452-9901

♦ ♦ ♦ ♦ ♦

## European Racers

DOS

Revell-Monogram

You say you've always wanted a CD-ROM game that combines high-performance cars and tips on model-building? Didn't think so. But if you did, Revell-Monogram's curious entry into the CD-ROM market might be for you.

Frankly, *European Racers* is hard to

describe, but suffice it to say that it's like *Test Drive* (the best-selling driving simulation that puts you behind the wheel of hot-rod street cars) mixed in with some animated lessons on gluing, painting, and assembling car models.

*European Racers* includes four very hot cars: a Lamborghini LP500S, a

Porsche 911, a Bugatti EB110 and a Nazca M12, all beautifully rendered. After choosing a car in the showroom, you can take it to the garage for a paint job to change the gray body to one of nine colors.

In the garage, you find a menu for most of the program's options. The "fun facts," available in the garage, are easily the strongest element of *European Racers*. Here you see gorgeous color photos showing the car's engine and interior, and shots of the car in action. The photo quality is excellent, and

while viewing, you can call up enough specs to satisfy most *Road & Track* readers.

The modeling tips come in video form, and while they're informative enough, the clarity of the film is so poor that it's hard to tell what's going on. (There are some useful lessons, though: I never thought about painting the tiny parts of a model while they're still attached to that plastic thing.)

In the showroom and in the garage, *European Racers* is, at the least, interesting. But once you hit the highway, the

game shifts into reverse. The graphics that were so handsome in the showroom are nowhere to be found outside. Instead they look like a very ordinary, 16-color computer game.

There are four race courses available where you can put your car through its paces, but the real test is finding the track. You start on a two-lane road and have to contend with oncoming traffic and surly cops. Gas stations are available for refueling and repairs. But those features become almost insignificant as you try to wrestle the car down the road. The steering wheel is controlled with a mouse, joystick, or keyboard, but it doesn't matter. Instead of the soft touch at the wheel that these cars deserve, the steering wheel turns in wide notches, so that you're constantly correcting to stay on course.



It's maddening: Trying to drive these high-performance sports cars is more like wrestling an 18-wheeler at top speed.

If the designers had paid more attention to the driving simulation, *European Racers* might warrant an endorsement for a limited audience. But the cars are almost impossible to control, making the driving frustrating instead of fun. As a result, *European Racers* runs out of gas quickly.

— Lee Buchanan

**Revell-Monogram**, 8601 Waukegan Rd.,  
Morton Grove, IL 60053 (708) 966-3500



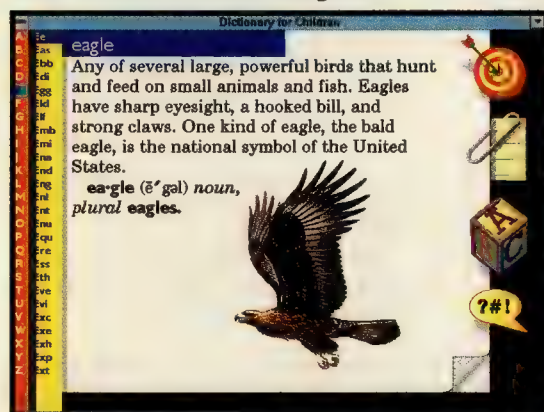
# EDUCATION

## Macmillan Dictionary for Children

MPC

Macmillan New Media

This title, like all books that move from print to CD-ROM format, begs an obvious question: Is it really a better product in its new computer-based medium? The evident advantages of a



paper-based book — portability and pass-along value — are the chief reasons many people, myself included, strongly prefer print titles to books on screen. But times, and technology, have changed. Thanks to the bigger, faster brains of PCs, improved sound technology, and the CD-ROM storage format, books can now become multimedia showcases with added dimensions — interactivity, animation, speech, and sound — that you can't find in print material.

*Macmillan Dictionary for Children*, the first consumer title from Macmillan New Media (a division of the book-publishing giant), is modeled after the best-selling book of the same name. Targeted to children ages 7-12, *MDC* features nearly 12,000 word entries, 1,000 illustrations, and — importantly — audio pronunciations.

It's easy for kids to navigate through

*MDC*, but we highly recommend that first-time users take the guided tour of the program's features. It's offered by Zak, a little animated fellow who later appears randomly in the program. Zak has appeal to youngsters, but older kids, say, ten and up, may find him annoying or a bit too juvenile.

You can find any dictionary entry in a variety of ways. You can scroll through the main Word List, select the Go To icon and type the word you're looking for, or access the A-Z list, from which you select the first letter of a word, then a sequential

group, such as *Nam*, *Nar*, *Nat*, *Nau*, and *Nav*, to target the word you want. The latter method helps if you're not sure of the spelling.

Once you've selected a word, it appears in large, readable type at screen center followed by the definition, pronunciation (with syllable breaks), and in some cases, an illustration. Click on the word and a voice pronounces it. You can

also click on words used in the definition to hear them pronounced.

The historical evolution of each letter is traced as well, with a graphic showing the letter as drawn by various ancient cultures and a brief note about how the letter was used or how it sounded.

A feature called My List, which allows the creation of a personal word list, is something that teachers, attentive parents, and dedicated students can use for building spelling and vocabulary skills.

Three games are included, and can be accessed at any time from the main screen: Spelling Bee, Hangman (only six body parts are drawn before you lose — too few for young players), and Words Within (e.g., how many words can you make from the letters in *cabinet*?). These games are fine inclusions, but they're limited and offer no scoring or competitive play. They'd have more value for kids

if they were enhanced in future versions. We should note that at the beginning of each game, choosing to use words from My List (if such a list has been created) lets kids get the appropriate spelling practice, giving the games more value.

You don't get the advantage of portability with this product, but you do get a rich experience that reinforces learning in new ways. *Macmillan Dictionary for Children* is a solid choice for home and school use.

— Lance Elko

Macmillan New Media, 124 Mt. Auburn St.,  
Cambridge, MA 02138 (800) 342-1338, ext. 15

♦ ♦ ♦ ♦ ♦

## Creation Stories

Time Warner Interactive Group  
MPC

According to the evidence gathered over the centuries, humans have always been concerned with their origins. The biblical Garden of Eden story has traditionally been the accepted version in most of the western world, but in the latter part of this century, the leading vote-getter has probably been the Big-Bang theory. And most of us are familiar with at least one other, be it the Greek union of Gaia and Ouranos or the Hawaiian myth of Red Earth Man. The salient point about this body of stories is that they are of mythic proportion, important narratives that have guided the development of cultures.

Warner New Media (now Time Warner Interactive) has compiled a large number of these narratives in *Creation Stories*. Genesis' "In the beginning" story is here, as are myths and legends from a great many cultures worldwide. About a quarter of the stories are narrated, accompanied by musical background and appropriate graphics screens, while the





rest are attractively presented in text form. Go through all of them, and it's impossible not to be somewhat overwhelmed by the imaginative powers of all the world's inhabitants.

*Creation Stories* is divided into six topics. "In the Beginning" offers stories about the origin of the universe, the earth, the seas, and so on. Included here is an essay on World Trees (e.g., the biblical Tree of Knowledge, the Norse World Tree), and another on attempts to scientifically determine the time of the universe's first day. "The World Was Ordered" covers such gems as Coyote's arranging of the stars in the sky (narrated), a discussion of various sun gods, and a fascinating essay on the Bethlehem star. "Humans Were Created" looks at everything from Spider Woman myths through Darwinian evolution, while "Disharmony Entered the World" offers such stories as the Greek Pandora myth. The other two topics, "The Cycles of Life Came to Be" and "The World Was Destroyed and Reborn," similarly combine a variety of stories with useful essays or compilations.

*Creation Stories* is an exemplary title in the field of "edutainment." It is superb as an educational tool, because it teaches about earth's cultures and beliefs while offering comparisons and other commentary. And because its main offering is stories, it has outstanding entertainment value as well.

It's impossible not to get drawn into the sheer magic of some of these stories, and it's equally impossible not to be fascinated by the program's Flood Table, which sets the world's great flood stories side by side for comparison.

There are a couple of problems, however. First, there are no search or copy features, which means that it's less useful as a research tool than it easily could be. Second, if you choose to listen to a narrated story, several megabytes of files are copied to your hard drive — you're not asked for permission, and the files are not removed afterwards. But these are minor points, considering what the package has to offer. Its true value is in its refusal to preach. Instead of assuming that certain stories are true and others mere fables, it offers them all and leaves any decisions to you.

— Neil Randall

**Time Warner Interactive Group**, 3500 Olive Ave.,  
Burbank, CA 91505 (818) 955-9999

♦ ♦ ♦ ♦ ♦

## Kaa's Hunting

MPC/Mac  
Ebook

**T**his second multimedia title from Kipling's classic work, *The Jungle Book*, marks a significant improvement over the initial offering, *Mowgli's Brothers*. While these two Ebook programs look much the same, *Kaa's*

*Hunting* adds animation, a new interface, and enhanced sound effects to an already entertaining multimedia storybook engine.

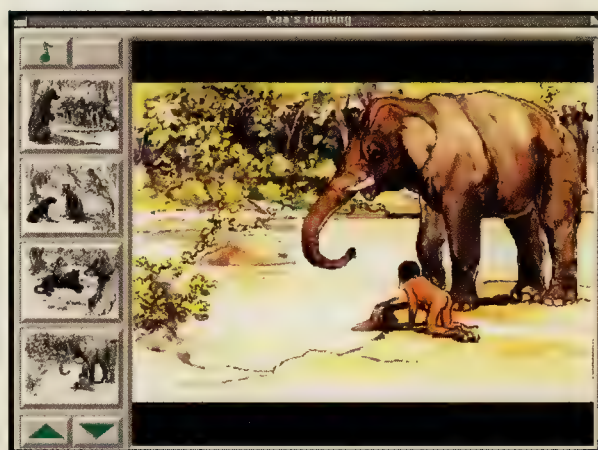
This second installment finds Mowgli, the boy-wolf, involved with the Bandar-log, the mischievous monkey people. Baloo the bear, Bagheera the

panther, and the serpent Kaa come to Mowgli's aid to set him on the right path. It's a delightful story, of course, and Ebook's use of sound effects, illustrations, and animation make a good tale even better.

The format is familiar to users of multimedia books: The text is displayed, with illustrations, as a narrator reads the story. The illustrations, both color and black-and-white, are quite attractive, as they were in *Mowgli's Brothers*.

But now there are surprises hidden in many of the illustrations. Click on the characters and you'll hear the howl of the wolf and the growl of the panther. Turn the page and the illustration comes to life as monkeys scamper through the trees, oranges drop, and birds fly across the printed text. Or watch as Kaa snaps up an exclamation mark.

The animations add a bit of flair to the program, but *Kaa's Hunting* is, after all, a book, and it's the excellent narration that really enlivens the story. There are some lessons to be learned within the text. Highlighted words, usually two or three to a page, are defined — in context — with the click of the mouse.



The original musical score is outstanding, and, like all audio features in *Kaa*, is superbly executed. The audio, soundtrack, and sound effects use both CD audio and digitized audio, and the result is laudable.

It's arguable whether the interface



here is an improvement over that in *Mowgli*. While the menu in *Mowgli* is always displayed at the top of the screen, the menu in *Kaa* is hidden, accessed by moving the cursor to the top or side of the screen. While it's nice that the invisible menu bar doesn't clutter the screen, the menu doesn't always appear quickly when you move the cursor. It's a glitch that makes doing something as simple as turning the page needlessly frustrating.

But this certainly isn't enough to keep this program from being strongly recommended. *Kaa's Hunting* delivers an entertaining mix of sight, sound, and, of course, a great story.

— Lee Buchanan

**Ebook**, 32970 Alvarado-Niles Rd., Suite 704,  
Union City, CA 94587 (510) 429-1331

♦ ♦ ♦ ♦ ♦

## Language Discovery

MPC

Applied Optical Media

When I was in grade-school, our sole exposure to foreign languages was the occasional singing of "Frere Jacques" or "O Tanenbaum." With *Language Discovery*, today's youngsters can point-and-click their way through delightful cartoon-style panels while learning nearly 1000 words in French, Spanish, German, and English.

The multilingual design of this CD-ROM makes it a special delight. Children start by entering a Learn Word screen in which several objects related to a specific environment (classroom, amusement park, campsite, etc.) are illustrated in a scrolling menu of icons. When the child clicks on an icon, the foreign word is displayed on screen and a human voice pronounces it in the language chosen at the bottom of the screen. By clicking on



the Change Language button, children can see and hear the word in each of the program's four languages.

Once children have acquired skill in recognizing foreign words, they can move to the Find Word screen, where all objects in the selected environment are contained in an illustration. Here they may practice finding an object by clicking on pictures to see and hear the foreign word. Or, they may test their skill by trying to find the appropriate illustrated object after the word has been pronounced. Once again, a Change Language button makes it effortless to move between languages.

The Word King game further challenges kids by displaying object icons, pronouncing the word and asking children to identify the foreign word that describes the objects. As the level of difficulty increases, children have less time to answer and are allowed fewer incorrect answers.

Finally, as a reference tool, a complete dictionary is available in which students can browse through the entire vocabulary of *Language Discovery*, reading and hearing the pronunciation of words.

The content of *Language Discovery* is decidedly at the beginner level. It concentrates on nouns and object identification, but never puts them into the context of a sentence. As a result, children will learn vocabulary but not usage or syntax.

Also, it seems that a few of the digital

sound files containing word pronunciation were missing on my CD-ROM. On rare occasions, I received a "file not found" error message after clicking on a word to hear it pronounced.

Nonetheless, *Language Discovery* is a well-produced, well-designed product that neatly accomplishes its aim of introducing children to other languages. It has charming illustra-

tions, excellent digital sound, and offers refreshing edutainment value.

— Bob Lindstrom

**Applied Optical Media**, 1450 Boot Rd., Bldg. 400,  
West Chester, PA 19380 (215) 429-3701

♦ ♦ ♦ ♦ ♦

## Mammals: A Multimedia Encyclopedia

Mac/DOS

National Geographic Society

This has been one of the best selling CD-ROM titles in the DOS world for years. Its use of full-motion video, sound, and color photographs set the standard by which new releases in the educational-reference category were judged.

*Mammals: A Multimedia Encyclopedia* has weathered the voyage to the Macintosh well. The interface has been visually enhanced and looks clean and crisp on the Mac screen. All of the elements that made *Mammals* a PC hit have survived intact, and are more convenient to access. A scrolling list of animals occupies the left third of the screen. The rest of the display contains a quick synopsis with a photo of the selected animal. By clicking on additional live buttons located at the bottom of the screen, detailed text essays, full-motion movies, photo albums, sound bites, and maps showing where the buffalo (and other mammals) roam can be called up.





Once your Mammalian IQ has been raised to "genus" level, try your hand at the Mammals Game, a collection of 36 different "cases" which send you sleuthing for the proverbial needle-nosed anteater in a haystack.

Unfortunately, much of *Mammals'* sharp looks are due to the main screen's resolution being limited to 640x480, the size of the Mac Color Classic screen. There's little excuse for recently written Mac programs not to scale up to a mid-sized screen, with 13- to 15-inch monitors the norm these days for Macs. The program's screen-size shortcoming is obviated somewhat by a "snapshot" feature that allows you to bookmark selected screens and recall or position them elsewhere on the display field.

Despite the new interface window dressing, the underpinnings of *Mammals* are beginning to show their age. Most of the video footage is decidedly grainy and somewhat choppy. Those who haven't already been exposed to *Mammals* will find more than enough to sink their canines into, but the bulk of the photos, sound, and expository text is still devoted to the mammals with which we're most familiar. Given the competition that's followed in *Mammals'* footsteps, it's high time for a rewrite that gives the Chevrotain, Guanaco, and Tasmanian Devil the full treatment that they deserve.

Regardless of our reservations, National Geographic's *Mammals* is a welcome addition to the menagerie of

Mac CD-ROM software. If you're on the prowl for a well-done slice of information on our warm-blooded friends, pounce on a copy of *Mammals* for the Mac.

—Arlan R. Levitan

**National Geographic Society,**  
Educational Services, Washington, DC 20036  
(800) 368-2728

♦ ♦ ♦ ♦ ♦

## The Rosetta Stone

Mac  
Fairfield Language Technologies

**T**he Rosetta Stone, the single most valuable archeological find of all time, provided linguists with the long-sought key to understanding ancient Egyptian hieroglyphics. A new multimedia language-learning program on CD-ROM, also called *The Rosetta Stone*, is perhaps the most valuable tool yet devised for non-linguists who want to speak, read, and write a new tongue.

*The Rosetta Stone* teaches the conversational basics of a foreign language — French, German, Spanish, or English (with Italian, Russian, Japanese, Turkish, and other languages to come), by combining spoken words, written text, and pictures. Each disc contains 92 sequenced lessons following a carefully developed system of vocabulary expansion. Lessons are divided into units, and units into chapters of ten screens. Each screen displays four colorful pictures and asks you to match them with a spoken or written word or phrase. Click on the right picture, and you move on to the next match; choose the wrong answer, and you're prompted to try again, as many times as is necessary to get it right.

Each lesson builds on the ones before and adds a few new concepts. You can easily complete a chapter or two in a

sitting. Moreover, you can customize your instruction by choosing one of 12 modes of viewing the material. There are no didactic discussions of pronunciation, grammar, and syntax, as in a textbook; instead, these concepts grow naturally from the increasingly sophisticated words and phrases you learn. The program keeps track of how you're doing and can generate a progress report.

As with any mix-and-match instructional material, a smart student can figure out many of the answers by a simple process of elimination. To compensate for this, scores are weighted so that the first and hardest match on a screen earns more points than the last and easiest one. Tests at the end of each chapter give you a better idea of what you really have learned; the results can be saved to a text file.

Two additional features take *The Rosetta Stone* well beyond any textbook or language tape. In dictation mode, a speaker dictates words and phrases for you to type, then scores your spelling accuracy. In voice-recording mode, you can record a phrase in your own voice (assuming your Mac is equipped with a built-in microphone) and compare it to the pronunciation of a native-language speaker.

There are a few ways this product could be improved. Since the program is aimed mainly at schools, it needs a better way to keep track of test scores and lesson progress for more than one student, including a comparative test report for all students who use the program. Also, when you begin a new session, the program should be able to pick up your lesson at the screen where you ended last.

As a book-oriented learner, I wished for an explanation of foreign alphabets and pronunciation, especially for the Russian lessons on the sample disk. Younger students may not care about this,





but older students may want to use *The Rosetta Stone* in conjunction with a standard text that will answer questions the program does not address. There's no doubt, though, that students will learn a new language faster and more easily with this well-designed, attractive teaching tool.

—Steven Anzovin

**Fairfield Language Technologies**, 122 South Main St.,  
Suite 400, Harrisonburg, VA 22801 (800) 788-8802

♦ ♦ ♦ ♦ ♦

## ***Scary Poems for Rotten Kids*** DOS/Windows/Mac Discis

**T**his offering from Discis features the twisted verse of *sean o huigin*, and it shares the many strengths of other Discis titles. It's a powerful, versatile reading tool, and it's a joy to use.

Discis recommends *Scary Poems* for ages seven and up, but the sheer scope of its features makes it a valuable educational tool for kids much younger, though the often nightmarish verse might scare some younger ones.

*Scary Poems* has the appearance of a book, with a page of text opposite a page with illustration. There's no wasted space here; just about everything you see serves a purpose. Click on the speaker icon and

the poem is read aloud. Click on a word and hear it pronounced, defined, identified as a part of speech, enunciated in syllables, or read in Spanish. Click on virtually any element of an illustration and you'll hear and see the word, and sometimes with sound effects.

But it's not just the myriad features that make

*Scary Poems* such a marvelous reading tutor. Just as important is the program's flexibility. Discis Books aren't just user-friendly; they embrace the reader with choices that gear the experience to virtually any reading level.

For a pre-schooler — though, again, *Scary Poems* may be a bit frightening for them — the program can be set just to read the poems aloud, highlighting the text as you go. For older readers, the setup menu lets you choose what features are accessed with a mouse click — and in what sequence events will occur.

Bookmarks are kept automatically when you exit, returning readers to their place when the program is restarted. And the program automatically keeps a list of words each reader has investigated, allowing for quick review of the lessons learned.

The quality of the audio narration is quite good, and the sound effects lend a

suitably somber mood to the poems. Most importantly, the pronunciations and definitions are delivered with excellent clarity.

It's hard to find anything critically wrong with *Scary Poems*. Each poem has only a single illustration, and it's repeated on each page as long as the poem lasts. And there's no animation — only handsome illustrations. But these extras aren't integral to Discis' intent. *Scary Poems* is designed to help teach children to read, and it succeeds admirably.

— Lee Buchanan

**Discis**, 45 Sheppard Ave. East, Suite 410, Toronto,  
Ontario, Canada M2N 5W9 (800) 567-4321

♦ ♦ ♦ ♦ ♦

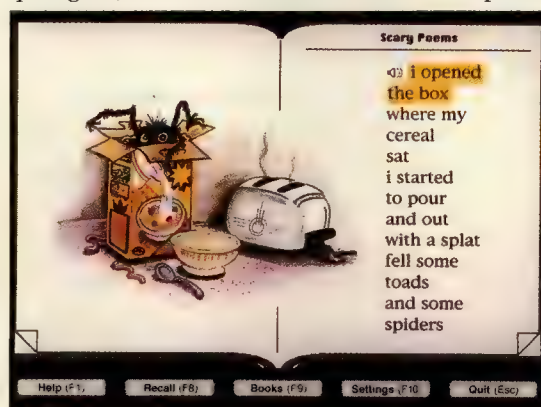
## ***Learn to Speak Series*** Mac/MPC HyperGlott Software

**A**dult education is a fertile area for CD-ROM software. HyperGlott Software points toward the future of CD-ROM self-help software with its fine Learn to Speak series of foreign-language education programs.

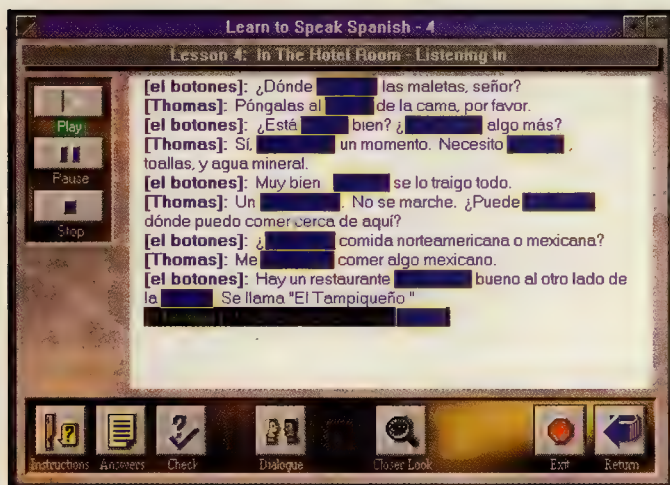
The Learn to Speak series teaches beginning- to intermediate-level foreign words and phrases, about 1000 in each product. All entries in the series make effective use of Mac- and PC-based multimedia by integrating a mouse-driven point-and-click interface with graphics

and digitally sampled native speech.

Because the basic Learn to Speak user interface and lesson design is common across the product line, it's easy for a user of one of the programs to get started rapidly with another. Currently, there are discs available for French, Spanish, and English as a second language. (German will be







available shortly.)

Each Learn to Speak CD-ROM consists of 30-40 lessons based on situations that a tourist is likely to encounter. Typical topics include changing money, ordering a meal, and asking directions. In one of the few inconsistencies across the product line, these titles do not use the same set of lesson topics.

Each Learn to Speak program has a suggested retail price of \$99. The French and Spanish discs are provided in a single CD-ROM package that includes both PC and Mac versions. Each English (as a second language) package includes only the MPC version and is available in versions for Spanish, French, Japanese, Italian and English speakers. We looked at the French, Spanish, and the English for English speakers discs.

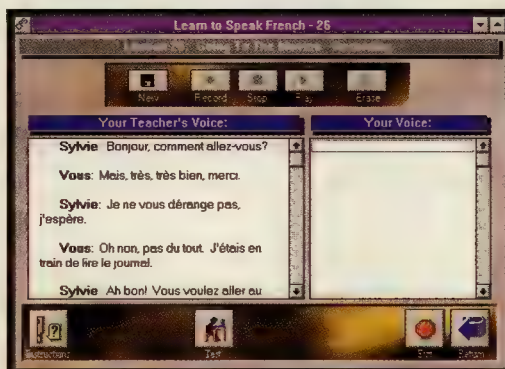
A lesson begins with a brief description of a situation, its setting, the speakers involved, and the purpose of the dialogue. The description text is initially displayed in the foreign language, but, by clicking within the text window, you can toggle to a version of the text in your language.

After reading the description, you may move on to a conversation read by native speakers of the language. If you click the Play button, you can hear the dialogue played through your system's

speakers. The pronunciation and reproduction is superb, authentically inflected and even slightly slurred in the manner of a native speaker. Throughout the series, the excellence of these readings ranks HyperGlott's software among the best of its

kind in this category.

While listening to a conversation, you can follow along with a text version of the dialogue. As in the preceding topic description, you can toggle between language displays with a mouse click. A Print icon also allows you to print out the screen text.



If you have an inexpensive microphone to attach to your Mac or PC sound card, you can test your pronunciation ability by digitally recording your own voice, then compare your performance with that of the recorded speakers. While getting used to the sound of your recorded voice requires a little adjustment, it's an excellent way to develop your ear for the language without the guidance of a human teacher.

Following the introductory description and dialogue, several other instructional exercises are accessible by clicking one of several on-screen icons. Each exercise is based on the lesson topic and

is intended to enhance your understanding of vocabulary and syntax.

The "Listening In" screen shows the lesson dialogue with some missing portions. The aim is to listen carefully while replaying the spoken dialogue, then type in the absent words and phrases. A click of the Check icon will instruct the computer to verify how many of your responses are correct. A Notes icon summons a text screen that elaborates on grammar and syntax issues raised by the lesson.

The two columns of the "Closer Look" exercise display all the words and phrases introduced in the lesson in both your native tongue and the foreign language. A click on any word will cause it to be pronounced. Buttons permit you to hide either the original or the translated vocabulary list, so you can move between columns, drilling yourself on word recognition and meaning.

The "Exploring" exercise expands on points of usage addressed in the current lesson with a brief text window.

Following these portions of the lesson, Learn to Speak reinforces your efforts with a number of tests and drills for listening, grammar, and pronunciation skills. The written tests are all evaluated by the computer; however, you alone can evaluate the success of your pronunciation through the record and compare feature.

Whether you've been assigned overseas, are anticipating a foreign vacation, or just want to broaden your linguistic horizons, the Learn to Speak series is an excellent place to start. While, strictly speaking, it is not a substitute for classroom training, any one of these CD-ROMs will develop a strong foundation for continued study of a language.

— Bob Lindstrom

**HyperGlott Software**, 5108-D Kingston Pike,  
Knoxville, TN 37919 (615) 558-8270



# APPLICATIONS

## My Advanced Label Designer

Windows

My Software Company

This flexible product offers a wide variety of design tools to create and print labels in more than 100 different shapes and sizes (Rolodex cards, name tags, videocassette or diskette labels, price

navigational protocol. You do most of your work in the Design Window. Here, you design the layout for your labels (or choose from one of the templates supplied), write and position the text, while adding lines, boxes, graphics, and color.

If you're preparing a mailing where each label will be different, you can create Dynamic Fields within the layout, with placeholders for the actual contact information. Open the Data Entry Window, double-click on each field (Name, Address, etc.) and enter the

wide variety of shapes and sizes, you'd be better off buying the floppy-disk version (\$59.95), which includes some clip art. If not, another \$20 for 1,000 images on CD-ROM might be the smart buy.

— Kathy Yakal

My Software Company, 1259 El Camino Real, Suite 167,  
Menlo Park, CA 94025 (415) 325-9372

♦ ♦ ♦ ♦ ♦

## Professional Tutor: Learning Lotus 1-2-3

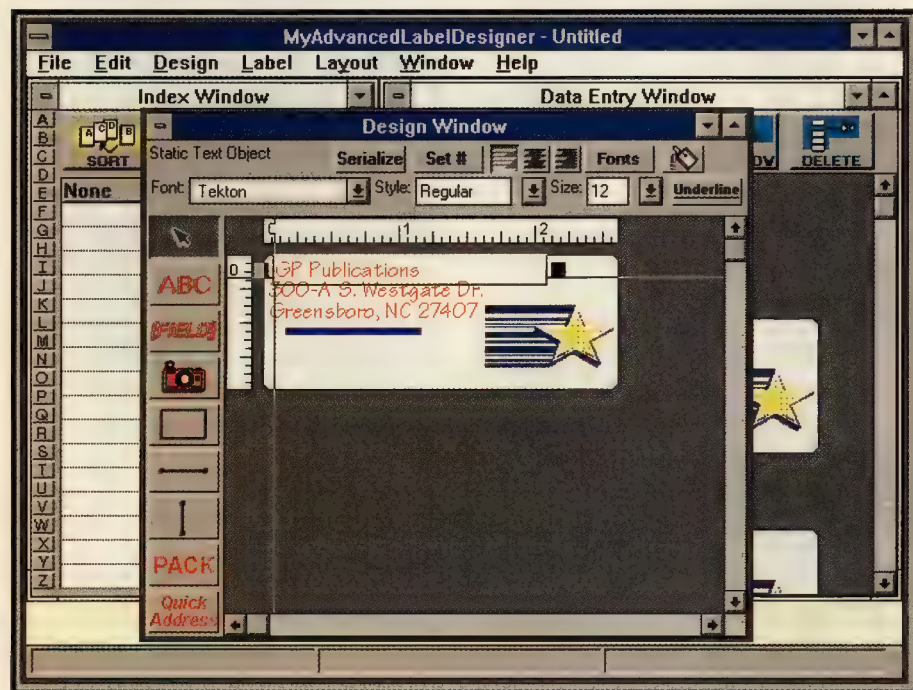
DOS

Paragon Consultants

Don't let the somewhat amateurish packaging mislead you. This multimedia training CD-ROM is a polished, effective way to get an introductory understanding of the features and functions of *Lotus 1-2-3* for DOS, versions 2.0 to 2.4. It's also a painless, even enjoyable way to overcome computer phobia.

The disc contains 12 narrated, interactive lessons that guide you through spreadsheet fundamentals. A narrator takes you verbally through each lesson as on-screen text windows, arrows, and limited animation demonstrate each procedure. At many points in each lesson, you're prompted to participate by entering keyboard commands. The program monitors your input and accepts only correct keystrokes. If you're unsure about what to enter, a status line near the bottom of the screen shows you the correct response.

The narrator's informal, relaxed style is clear and easy to follow; and you can listen through headphones connected to the audio jack of your CD-ROM drive or by playing it through your system's sound board. Several pauses built into this presentation allow you to review the on-screen display and move at your own pace.



tags, raffle tickets, and so on). You can liven up your labels using any of the 1,000 clip art images included on CD-ROM, or import your own graphic images in EPS, PCX, BMP, DIB, WMF, TIFF, or GIF formats. Existing database information can be imported in comma, tab, double-quote comma, or custom delimited files, and exported as double-quote comma delimited files.

If you're already a seasoned Windows user, you shouldn't have trouble getting up and running with the program; it uses standard Windows pull-down menus and

appropriate data for each label. You can also import an ASCII file after you've set up Dynamic Fields.

The third major workspace, the Index Window, is an online address book. You can search for a label you've printed, or sort labels by specifying an indexed field (i.e., all contacts in Texas) and earmark them for printing. *My Advanced Label Designer* works with both dot-matrix and laser printers.

If you already have a good clip-art collection and just want a product that will let you design and print labels in a



The only drawback is that the digital samples in the narration have many slightly annoying clicks in the soundtrack.

Each session consists of an interactive, narrated lesson focusing on topics such as copying cells, entering calculations, and printing. Following the lesson, there's a review of all material covered and a test on key lesson points. Since all training takes place within *Learning Lotus* itself, you don't need a copy of *Lotus 1-2-3* to run the program.

Paragon reckons that the 12 step-by-step lessons contained in this course are the equivalent of two full days of classroom instruction. Since the course contents are aimed at the spreadsheet beginner, *Learning Lotus* starts with fundamental spreadsheet concepts of rows, columns, and values. By the end of Lesson 12, the student should have a basic, practical knowledge of how to use 1-2-3.

After each lesson, the program instructs you to load your own copy of 1-2-3 to complete a practice assignment

VL2: 19151 "Entertainment"

1993 Monthly Budget January			
Expenses	Budgeted	Actual	Difference
Mortgage	850	850	0
Utilities	250	230	20
Household	500	515	-15
Insurance	200	200	0
Car Pmt.	175	175	0
Day Care	300	300	0
Salaries	50	100	-50
Total	2325	2378	-45

15% - Percentage  
\$180.00 - Dollar value

15 Feb 93 09:15 AM  
BT:R5 | AUDIO: ON | F1:MENU | F2:PAUSE

explained in the spiral-bound, 90-page manual. After you've completed the assignment, *Learning Lotus* checks to see if you've created the correct file during the practice session. If not, the program asks if you want to continue before finishing the lesson.

Given its introductory content, *Learning Lotus 1-2-3* won't turn you into a

power spreadsheet user. However, if you've been looking for a way to acquire basic spreadsheet literacy, this is an efficient self-paced course that really works.

— Bob Lindstrom

**Paragon Consultants**, 158 Sandy Dr., Boulder, CO 80302  
(303) 442-1613

\* \* \* \* \*

## CorelDraw! 4.0

Windows

Corel Corporation

From the beginning, *CorelDraw!* attracted graphic-arts professionals to the PC, offering ease of use and features lacking in even the best Macintosh illustration tools. But nobody expected the grab-bag Corel would include with its 3.0 version.

Sure, *CorelDraw!* 3.0 vastly improved on its earlier incarnations, but it also included a full-featured paint tool with powerful image editing and photo-retouch tools, a complete charting package, and a capable slideshow/animation presentation

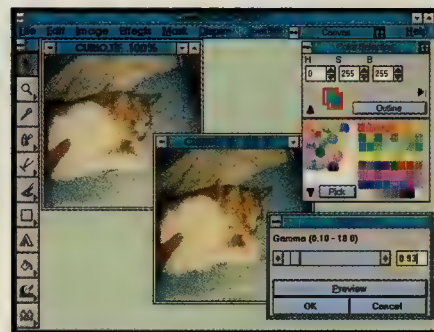
module. If this weren't enough, Corel threw in a CD-ROM packed with 15,000 pieces of clip art and hundreds of typefaces. The crowd went wild.

Even though *CorelDraw!* 4.0 has been released in all

its glory, you can still get 3.0 at a steal of a price. Those who couldn't justify the purchase of a high-end graphics package can now make that decision with no more pain than buying a couple of games (and upgrade to 4.0 later with a deep discount off of full retail). Another advantage in buying 3.0 is that it's a mature product, with all its bugs worked out. (The first

release of 4.0 had some serious problems. Fortunately, the 4.0a revision is much better.)

Most freehand artists prefer to paint with pixels freehand, while most desktop publishers like to precisely draw with geometric objects. With the *CorelDraw* 4.0 package, you get the best of both worlds. A *PhotoPaint* picture can become the background or used as clipart in a *CorelDraw* document, and a *CorelDraw* object or drawing can be exported as a bitmap for enhanced editing in *PhotoPaint*. Additionally, either package can create images for use in *CorelShow!*



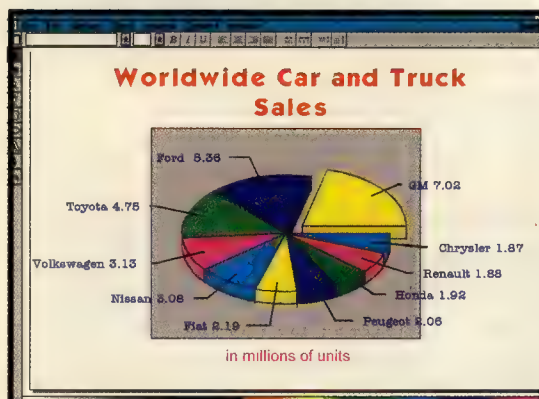
(the presentation tool) or *CorelMove!* (the animation program). *CorelMosaic!* ties it all together, since it can create thumbnail (miniature) images in folders — an easy way to organize your drawings.

*CorelDraw!* 4.0 is the first version to support OLE 2.0. You can embed a *CorelDraw* image in a word-processing file. To edit the embedded picture, just double-click on it to start *CorelDraw*, which brings up the *CorelDraw* menus and toolbar directly within your word processor. (This is only the ideal case, since OLE 2.0 is still in its infancy.)

*CorelMove!*, a 2-D animation tool, is a fabulous addition to the Corel family. You can use the included animation library of actors, sketching out a path for objects to follow, or go all the way and create your own custom animation cels in *CorelDraw!* or *PhotoPaint*.

The 4.0 version includes two CD-ROMs, the first with an additional 3,000





clip-art choices (now 18,000 total). Incredibly, you'll find 750 TrueType fonts (ATM, too) on the disc. Disc 2 has additional samples, but is mostly full of Microsoft Video for Windows files that provide an interactive video tutorial. I would have preferred a video tape, since VFW can be tricky and unsatisfyingly small and jerky, especially on a 386 with standard VGA. Yet nowhere will you find a better use of CD-ROM than with this Corel package — the discs are packed with truly useful (not filler) material, and so many multimedia features sans gimmickry.

A complete review of every CorelDraw! feature could fill a book. Taking a page from David Letterman, I bring you my favorite of these new features below. There are many more surprises in store, and playing with version 4.0 is a real treat, as you discover new tricks and treats at every turn.

#### 4.0's Top Ten Best New Features

10. Templates for plug 'n' play document design
9. Convenient auto-dimension lines (to show height/width measurements, etc.)
8. Ctrl-click to edit objects within a group
7. Drag and drop symbols (similar to Visio)
6. Weld objects, removing overlapping regions

5. New roll-ups allow easy contouring and blending, font preview, distortion envelopes, powerlines (strokes of varying pressure thickness), node editing, even a mini-database
4. Cloning: copy an object, and it automatically updates all copies when the master changes
3. Fractal textured fills, such as marbling, fire, ocean, crinkled

aluminum, and much more, with thousands of variations

2. Improved text handling with automatic flow, text wraparound, style sheets, and import filters for most word processors and many more graphics formats

1. Desktop publishing. Multi-page documents, page layout, columns, rulers, and now professional-quality color separations with trapping and new Trumatch support

#### 4.0 Tools' Top Ten Great Features

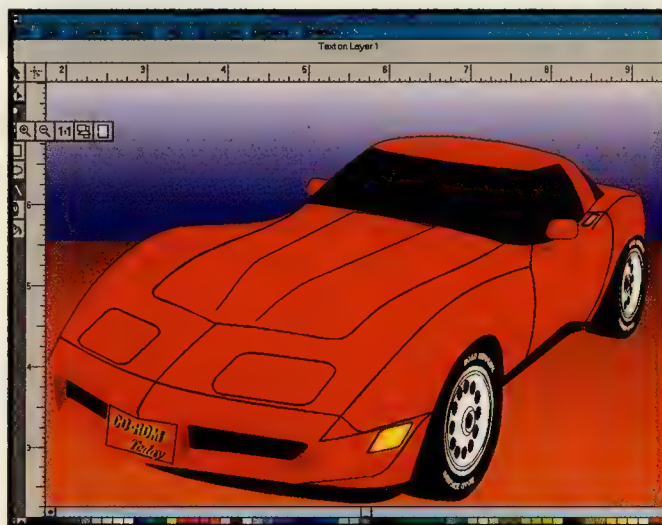
10. Uniform user interface (such as roll ups in PhotoPaint) and better integration between modules, not to mention OLE 2.0
9. Mosaic now catalogs most image formats, and launches associated applications
8. Better support for Kodak Photo CD image editing in Photopaint and Mosaic
7. CorelChart! is now a mini-spreadsheet with over 40 formulas for datasheet view
6. PhotoPaint shares CorelDraw's powerful color separation printing and

monitor calibration

5. New Pointillist and Impressionist effects in PhotoPaint
4. PhotoPaint supports TWAIN for built-in scanning, and has better memory management
3. CorelTrace! now does Optical Character Recognition and TWAIN scanning
2. CorelShow! has better animation (integrated with the new CorelMove!), live branching with a simple script language, and timelines for synchronizing all kinds of multimedia objects
1. CorelMove! is not just an animation tool — it's a powerful multimedia construction kit

— Charles Brannon

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## Sony's MD DATA: Floppy of the Future?

“O

h, no!” you cry. “Not another new digital disc format!”

Yes, another new digital disc format. We've already got CD-ROM, CD-I, CDTV, CD-R, CD+G, CD Video, CD audio, Photo CD, Sega CD, and more. Now Sony has announced MD

DATA, a recordable digital disc that could hit the market by mid-1994.

But don't worry -- MD DATA isn't intended to make CD-ROM obsolete. In fact, it could complement CD-ROM in fascinating ways. If MD DATA makes anything obsolete, it'll probably be your floppy disk drive, which is already obsolete.

In the same way that CD-ROM was spawned by CD audio, MD DATA is a child of Sony's MiniDisc. Introduced in 1992, MiniDisc is a digital audio format that addresses two of the biggest consumer complaints about regular CD audio: recordability and portability.

Audio CDs are play-only, of course, like CD-ROMs. But MiniDiscs let you record music, erase, and record again, just like cassettes -- except they're digital, not analog. And because MiniDiscs are enclosed in a plastic cartridge about 2.75-inches square, they withstand rougher handling and are better suited for small, portable devices.

Sony has been selling its MD Walkman recorder for about \$700. However, it's not exactly taking the world by storm. Consumers, educated by the Beta vs. VHS battles of the 1980s, are wary of new entertainment formats. Audio-philosophers are wary, too, because MiniDisc squeezes 74 minutes of music (the same as a regular CD) on its much smaller surface by digitally compressing the audio. The compression scheme minimizes the loss of fidelity, but some people claim they can hear a difference.

MD DATA is Sony's attempt to extend MiniDisc into a format for storing any kind of data, not just digital audio. With an MD DATA drive on your computer, you could save text files, spreadsheets, databases, graphics, audio, video, backups of your hard disk -- anything.

You can do this now with floppies, but the difference is

that an MD DATA disc holds 140 megabytes. That's more information than you could fit on 97 of the 3.5-inch, 1.44-megabyte floppies that are standard equipment on today's personal computers. Sony estimates that a blank MD DATA disc would cost about \$20, so the price per megabyte is quite low.

That larger capacity is also better matched to the needs of today's personal computers. Since the 1970s, application programs and the files they create have ballooned into

megabytes, but floppy disks haven't kept pace. Backing up a large hard drive onto floppies has become an onerous chore. And giving someone a file by passing along a floppy disk often

***A single MD DATA disc holds more information than you can fit on 97 high-density 3.5-inch floppies.***

isn't possible, because many of today's files (graphics, page layouts, video clips) won't fit on a floppy. That's why removable hard disks are so popular with multimedia authors and service bureaus.

MD DATA could neatly solve that problem. Yet it wouldn't make CD-ROM obsolete, because it can't match CD-ROM's even larger capacity of 600 megabytes. It wouldn't replace your hard drive, either, because MD DATA's transfer rate is only 150 kilobits per second, the same relatively slow speed as a standard CD-ROM drive. Instead, MD DATA might eventually replace your 3.5-inch floppy drive, just as 3.5-inch floppies have supplanted 5.25-inch disks.

Why not apply the magneto-optical technology of MD DATA to five-inch platters, so we'd have recordable CD-ROMs? Similar formats already exist, but they're much more expensive, and five-inch discs are considered too big for portable applications.

A more likely competitor to MD DATA is Floptical technology, which stores 21 megabytes on a 3.5-inch disk and can read most of today's 3.5-inch floppies. But Floptical, like MD DATA, needs widespread industry support before it can become a true standard.

It's too early to foresee whether MD DATA will gain that crucial support. Still, it's an interesting new development that's well worth watching.





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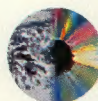
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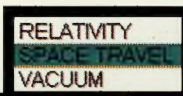


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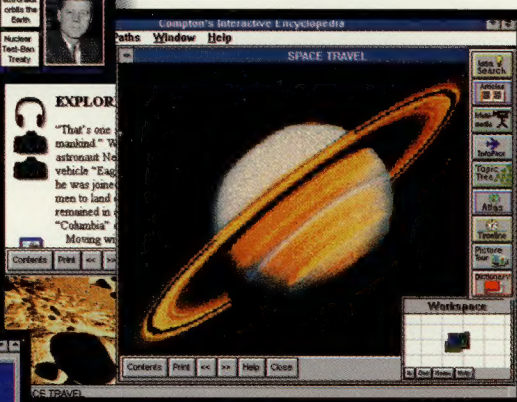
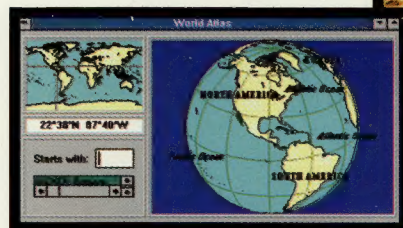


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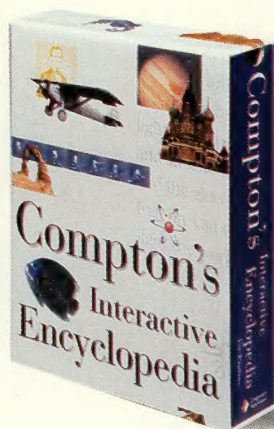
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